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E-learning in higher education: student and teacher variables in the Chinese and Flemish cultural context

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Foreword

This is a journey following the path of e-learning. This is a journey of a cross-cultural study. And this is a journey of a Chinese scholar to Belgium. It is a personal journey that re-shapes her academic thinking and cultural well-being and sometimes struggle as a Chinese gradually assimilating some taste of the specific Flemish culture. It is also a journey of several years intrigued by the question “Do Chinese students pursue learning in a different way compared to their European peers?”

This is a journey that I have pursued with continuous support from my promoter Prof. dr. *Martin Valcke* and co-promoter Prof. dr. *Tammy Schellens*. I am extremely grateful for both of them for their great help and enlightenment for my research and the dissertation. I very much appreciate the inspiration and guidance of *Martin* for my research and his extra efforts made for the preparation of teaching materials that were used in the Chinese educational setting and the enthusiastic lectures that he gave to the Chinese students related to this research. Furthermore, his dedication to develop international cooperation with Chinese universities is very much welcomed and appreciated by the Chinese counterparts. I also appreciated the support from both *Martin and Tammy* as to the numerous instruments and tests conducted in the Flemish and Chinese contexts. Thanks to their great support, the studies in the framework of this doctoral research have resulted so far in 7 published or accepted articles in international journals, 1 submitted manuscript, 4 conference proceedings and 10 paper contributions at international conferences. I am also very grateful to my guidance committee Prof. *H. Pinxten*, Prof. *Y. Rosseel* and Prof. *R. Soetaert* for their constructive comments and support during the whole doctoral research period.

The studies involve Chinese and Flemish students using Chinese and Dutch language respectively, using English as the intermediate language when designing the questionnaires, learning content, assignments and tests in both contexts. The amount of work for this study is thus tremendous. My sincere gratitude goes to all the colleagues and friends who have helped me to set up the studies in the two contexts. Among my Flemish colleagues, *Hester, Bram, Marijke, Hilde, Hendrik, Melissa, Isabel Rots, and Katrien* have been extremely helpful. I am also grateful for the help from ICT&O of Gent University (UGent) for providing the information as to the installation of the Dokeos e-learning system in the Chinese setting. Among my Chinese colleagues, the help of dr. *Li Yifei* and dr. *Zhang Chunli* is tremendous. It is impossible to count how many days and hours both of them have worked together with me discussing all the details for the implementation of the studies at Beijing Normal University (BNU). My sincere acknowledgements also go to Prof. *Li Jiayong*, Prof. *Zeng Xiaodong*, *Yuan Li*, dr.

Zhang Shudong, and Zhao Jing from BNU and *dr. Yu Kailian* from Capital Normal University (CNU). In addition, I would like to thank the colleagues from Beijing Golden Global View Co. who helped to install the Chinese version of Dokeos e-learning system in Beijing. The Dokeos system was used for the e-learning implementation of the present study at BNU, in parallel to the system used at UGent. Furthermore, I would like to thank all the teachers/professors and students from UGent, BNU and CNU who have participated in these studies. It is impossible to name all of them. But their insights and comments stay with me; some of them may have been reported in this research, while a large part of them only remains in my memories and knowledge base which consciously or unconsciously shape my understanding or interpretation of teaching and learning within the concerned educational contexts that are reported in this dissertation. As such, the process of this research itself manifests a long journey of numerous exchange and assimilation across two cultural and educational contexts.

This is also a journey that I have gone through with my beloved husband. Because of him, I have one more reason to understand the Flemish culture in a deep manner. And it is a journey with deep love to my dearest daughter; she is and will be a manifest of multi-cultural influences and upbringing.

But what is culture? Is it about both what people think and how they behave? And more importantly, the context that shape their thinking and behaviour? In our daily life, professional and academic experience, we encounter, feel and experience these differences. However, we also see cultural assimilations. Culture is dynamic because it is basically learning (concepts and learned behaviour). As the same time, it is always situated in a certain context in a certain period of time, and thus is “stamped” by its historical tradition and current society. This is just a starting point to share with you. Literature will be referred in this dissertation as to the concept of culture and cultural context. The studies included in this dissertation are empirical. We have to position ourselves when taking a theoretical starting point or choosing an explanatory factor. I fully understand that culture is a topic that can be discussed in many different meanings and various diverse areas of human thinking, behaviours and interrelationships. Culture is unique for a certain group in a certain period; however, it is always interwoven and continuously evolving. Thus dynamic is its fundamental nature and being open should be the right attitude when we analyze students and teachers in different cultural context. “We are what we are because of culturally based learning” (Segall, Dasen, Berry & Poortinga, 1990). But we all learn to understand each other in a better way.

The journey continues...Let's join hands.

Chang Zhu
Gent, January 2009

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Chapter 1

General introduction *

Abstract

This first chapter introduces the general research problem, the theoretical background, and the overall research design of this dissertation. An overview of the research questions and the outline of the study components of this research are described.

Introduction

General research problem and the research perspectives of this dissertation

Teaching and learning is essentially a cultural transmission and culture acquisition processes (Wolcott, 1991). Previous research indicates that how students learn is affected by their cultural traditions and beliefs (Bourdieu, 1977; Kelly, 1973; Säljö, 1979; Tweed & Lehman, 2002; Woodrow, 2001). Others state that cultural differences need to be taken into account when designing and implementing learning environments (Lal, 2002; Ramburuth, 2001; Woodrow, 2001; Ziguras, 1999). The need for a deep understanding of student differences in relation to their cultural background is increasing with the internationalization of higher education and international collaboration between universities. Research into student learning in different cultural contexts may lead to an improvement of instructional design and student performance in learning.

During the last two decades, many initiatives to innovate education and to optimize student learning have been studied. Among these initiatives, the social constructivist learning theory has greatly influenced educational innovations. It stresses learning as an active, constructive process during which learners create meaning through interactions with each others. The use of information and communication technologies (ICT) has become increasingly

* Part of this chapter is based on Valcke, M., Zhu, C., & Schellens, T. (2008). A cross-cultural study of student learning in e-learning environments. In Y. Waghid, F. Dochy & C. Carl (Eds.), *Proceedings of the EARLI 2008 Advanced Study Colloquium Research on Cultural Differences and the Influence on Education in Teaching and Teacher Education* (pp.186-207). Stellenbosch: University of Stellenbosch.

popular to support teaching and learning, resulting in the design and implementation of e-learning environments in higher education.

E-learning embraces a variety of learning modes. In the present dissertation e-learning is used to refer to computer and Internet delivered learning in blended learning environments, with a special focus on online collaborative learning (Tsai & Machado 2002). This implies that next to online provisions, also face-to-face contact is still a significant part of the learning setting. E-learning offers many advantages, such as allowing learners to learn at their own pace, and independent of time and place. However, e-learning also presents challenges, such as the critical congruency between characteristics of the e-learning environment and student characteristics and the influence of both student and teacher's cultural-educational background on their learning/instructional preferences and performance in the e-learning setting.

E-learning provides a novel way of teaching in higher education. Many schools and universities in the developed world have integrated e-learning, and within the e-learning context have especially embraced computer-supported collaborative learning (CSCL) as an important instructional and learning component. In other parts of the world, the same trend is observed and the need for e-learning is increasing (Survey Research on e-learning in Asian countries, 2002). It has been noted that many e-learning applications are developed by adopting a Western pedagogy for use in the East (Murphy, 2006). However, there are hardly empirical studies evaluating the implementation of an e-learning environment in different cultural contexts. Cross-cultural instructional challenges are considered of significance for cross-cultural educational activities. The understanding of how culture influences student behavior and consequently the learning process is a key issue in this context (Aguinis & Roth, 2003). Brennan, McFadden and Law (2001) also emphasize that cultural needs and cultural differences need to be taken into account at every phase of the design and delivery of e-learning and support of student learning activities.

The learner and the teacher are two important actors in e-learning environments. Teaching and learning is influenced by the context where it takes place, and learners and teachers bring their characteristics to the learning environment and as such interact with the learning and cultural context. Understanding student characteristics and teacher perspectives is especially crucial when e-learning is implemented in a cross-cultural way. This brings us to the general research problem of the present dissertation and the studies described in the consecutive chapters: What is the impact of implementing an

e-learning environment in two different cultural contexts, and how is this related to student variables and teacher perspectives?

This dissertation is set up by adopting three research perspectives: the perspective of the learner, the e-learning implementation and the teacher. And central to the three perspectives is their interaction with the cultural-educational context. Figure 1 depicts the relationship between these perspectives. We refer to the “cultural context” in a broad way, including the comprehensive context where teaching and learning is situated (cultural, educational, institutional, etc.).

As to (1) the student variables, we focus on examining student characteristics related to learning, including student epistemological beliefs, conceptions of learning, learning approaches, motivation, learning strategies, etc. As to (2) the e-learning implementation, a parallel e-learning intervention has been implemented in two cultural contexts. Linked to the e-learning implementation, student perceptions of the e-learning environment, influential factors on their performance in e-learning, and variance or invariance in student satisfaction, the learning process (knowledge construction) and academic performance in online collaborative learning are examined. As to (3) the teacher variables, we focus on teachers’ perspectives about teacher roles, their views related to the social-constructivist learning principles and their adoption of online collaborative learning.

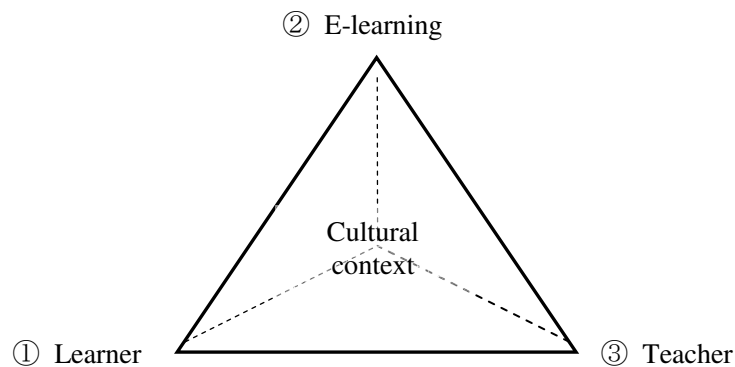


Figure 1. Research perspectives in view of cross-cultural e-learning implementation

Before introducing the theoretical background of this dissertation, we briefly introduce the cultural context, and perspectives about cross-cultural studies.

Cultural context: conceptions of culture

The concept of culture has been used in many peripheral contexts and has been defined and analysed in many different ways. The most frequently quoted are the cultural anthropologist perspective and the cross-cultural psychologist perspective. Cultural anthropologists use the term "culture" to refer to the universal human capacity and activities to classify, codify and communicate their experiences materially and symbolically (Bodley, 1994; Douglas, 1992; Geertz, 1993). They describe culture as a shared, learned, symbolic system of values, beliefs and attitudes that shapes and influences perception and behaviour. It is dynamic and can be taught and learned. Geertz (1993, p.89) therefore interprets culture as "a historically transmitted pattern of meanings embodied in symbols, a system of inherited conceptions expressed in symbolic forms". Other conceptions of culture stress what is considered to be the collective property of a group. For example, Bodley (1994) uses the term "culture" to refer - collectively - to a society and its way of life. In this study, we adopt the definition of Berry, Poortinga, Segall and Dasen (1992, p.1) who use the term "culture" to refer to "the shared way of life of a group of people". Cross-cultural psychology focuses on both variability and invariance of human behaviour and mental processes under diverse cultural conditions (Ho & Wu, 2001, p. 4).

It is to be stressed that we adopt in the context of this dissertation the concept of "cultural context". Culture can be approached as context (Lonner & Adamopoulos, 1997). A cultural context is "composed of generations of people in coordination with each other over time, with some common and continuing organization, values, understanding, history, and practices that transcend the particular individuals. At the same time, individuals and their generational cohorts change community traditions, with changing times and conditions" (Rogoff & Angelillo, 2002). Cultural context is both continuous over time and responsive to the historical moment. Thus we need to bear in mind cultural diffusion and the dynamics of culture. Giroux (2000, p.132 & p.133) describes culture as the site where identities are constructed: it is "the site where young people and others imagine their relationship to the world; it produces the narratives, metaphors, and images for constructing and exercising

a powerful pedagogical force over how people think of themselves and their relationship to others”. Cultural context can serve as a perceptual framework that guides the interpretation of interactions and the construction of meanings (Cortazzi, 1990).

Cross-cultural studies

In most cross-cultural studies, culture is treated as a set of conditions (Shweder et al., 1998). It serves as an overarching frame encompassing all types of interactions and relationships between variables (Lonner & Adamopoulos, 1997). Contextualization is particularly important in cross-cultural research.

Van de Vijver and Leung (1997) point out that cross-cultural studies can be regarded as quasi-experiment studies in which existing, intact groups are compared. When individuals from different cultures are studied, culture can be seen as an independent variable. However, in order to be more specific and meaningful to explain cultural similarities or differences between cultural groups, culture can also be operationalized by context variables or cultural dimensions (Poortinga & van de Vijver, 1987). From a methodological perspective, context variables can be used to validate a particular interpretation of cross-cultural differences. They can be related to person variables (such as student characteristics) or setting variables (such as educational systems, in casu e-learning). Whiting (1976) also suggests that culture can be dissected into separate contextual factors. Furthermore, the indirect (e.g., mediating) role of culture on behaviour outcomes has also been emphasized (Lonner & Adamopoulos, 1997).

Cross-cultural research is especially important to understand cross-cultural variations. It also plays an important role in the examination of the generality of theories and findings. The present dissertation fits into this approach. In the different studies we examine students and teachers teaching and learning in two distinct cultural contexts (Beijing, China and Flanders, Belgium). We introduce the specifics of both cultural and educational contexts later in this dissertation.

Theoretical background

Student variables related to learning

As to student variables related to learning, we focus on the following variables that will be explained below.

Epistemological beliefs

Beliefs about the nature of knowledge and knowledge acquisition are labeled as epistemological beliefs (Schommer, 1994). Research has paid growing attention to the conditional or situational factors that shape learning experiences of students (Alexander, Murphy, Guan & Murphy, 1998; Chan & Elliott, 2004). One of these factors is related to the epistemological beliefs of students (Abelson, 1986; Garner & Alexander, 1994). Educational researchers have become increasingly aware of the impact of these beliefs about knowledge on learning and learning related processes, and on learning performance (Wineburg, 1991).

Conceptions of learning

Learning means different things to different people. Conceptions of learning have been explored mainly in terms of “cognitive process”, “motivation”, and “behavior change”. The acquisition, knowing and application phases of learning are most often identified, such as “acquisition of facts”, “increase of knowledge” (Säljö, 1979), “memorising and reproducing” and “applying” (Marton, Dall Alba & Beaty, 1993; Marton, Watkins & Tang, 1997). “Understanding” is also considered as a part of the cognitive processes (Dahlin & Watkins, 2000). Learning is furthermore a process that depends upon experience and leads to progressive changes in future behavior. Previous studies suggest that students’ conceptions of learning are derived from and influenced by the individual beliefs about the nature of knowledge and knowledge acquisition (Chan & Elliott, 2004).

Approaches to learning

Approaches to learning have been studied in reference to how students tackle specific learning tasks within a course. “Deep and surface approaches” have been identified as two different levels of processing (Marton & Säljö, 1976). The two approaches have been elaborated in a more detailed way by Entwistle

(1981), Ramsden (1992) and Biggs (1993). This resulted in the identification of a third approach, known as achieving or strategic approach. It is seen as a very well-organised type of surface learning approach, based on the motivation to get good marks (Entwistle & Ramsden, 1983). Previous research has generally supported the underlying structure of surface, deep, and strategic approaches to learning (Biggs, 1993). Empirical studies have indicated that learning approaches are context-dependent and influence procedural processes (Case & Marshall, 2004).

Student motivation and learning strategies

Many factors influence student learning. Among them, students' motivational orientations and learning strategies play important roles (Pascarella & Terenzini, 1991). Available research states that motivation and learning strategies are significantly correlated with academic performance (Pintrich & De Groot, 1990; Pintrich & Schrauben, 1992). Recent studies stress that a high motivation level is necessary for students to be successful in e-learning (Ergul, 2004). Ames (1992) suggests that the nature of the learning environment itself is critical to fostering motivation and cognitive engagement of learners

Computer competence

Studies indicate that students in an online environment need a certain competence level as to the mastery of computer skills (Dutton, Dutton, & Perry, 2002). Other studies report that a high computer competence level has a significant effect upon actual e-learning participation (Alexander, 2001). Furthermore, Lim (2001) states that computer competence is a statistically significant predictor of student achievement in online courses.

Perceptions of the learning environment

In learning environment research, students' perceptions of the learning environment are considered to have a pervasive influence (Den Brok, Brekelmans & Wubbels, 2007). It is, on the one hand, an important factor to evaluate the nature and quality of educational interventions (Teh & Fraser, 1994); and on the other hand, an important factor to predict student academic performance and learning outcomes (Ramsden, 1991). Student perceptions are a function of both the designed context and of students' prior experiences. Previous research indicates that when students are exposed to a particular

learning environment, they tend to respond and react differently (Meyer & Muller, 1990).

E-learning and Computer Supported Collaborative Learning (CSCL)

The development of e-learning and CSCL in higher education

There are many types of e-learning and research on e-learning reflects these different focuses. Among them, one is technology-oriented and one is clearly pedagogical-oriented. The former focuses on the actual use of information and communication technologies (ICT) in learning, training or education; and the latter focuses on the interactive processes that are fostered between teacher and the learner through the electronic tools. Next to comprehensive e-learning set-up, many institutes adopt a blended learning approach, thus combining traditional face-to-face education with e-learning.

E-learning is essentially the network-enabled transfer of skills and knowledge. Two main functions of e-learning are often discussed: the *distribution* of course material, and *interactive* learning. Underneath these two basic functions we can distinguish two different pedagogical views of teaching: one is oriented towards the delivery of information and the other is based on the social constructive perspective that teaching and learning fosters active and interactive learning processes. The latter is also more in tune with the criteria of meaningful learning (Löfström & Nevgi, 2007). The studies set up in this dissertation adopt the latter approach towards e-learning.

Learners can build up knowledge through the assimilation, creation and sharing information. CSCL stresses the sharing of meaning and knowledge through the interactive nature of the e-learning tools. Through online collaboration, learners work together on cases or assignments. Each learner puts forward his or her prior knowledge and experience; together they access information and theory; and together they build up their knowledge during the process of online interaction. The key theoretical assumption of computer supported collaborative learning is that students learn through group interaction (Gerlach, 1994; Roblyer, Dozier-Henry & Burnette, 1996).

In order to better facilitate knowledge construction of the learners, educators should not only implement e-learning in a static way. Creating online collaborative learning processes based on participation and mutual engagement in order to ensure the negotiation of meaning is a complex pedagogical challenge (Cornell & Martin, 1997). It has been argued that educators, who carry with them constructivist or objectivist assumptions and beliefs, reflect these in their teaching practices (Jonassen, Davidson, Collins,

Campbell, & Haag, 1995). Educators and e-learning practitioners should bear in mind the constructivist pedagogical thinking and design of the collaborative processes. They should help learners to integrate and draw upon individual prior experiences, their competencies, and interests and engage the students in interactive collaboration and shared knowledge building (Sorensen & Takle, 2002).

CSCL implies the joint construction of meaning through interaction with others and can be characterized by a joint commitment to a shared goal (Lewis, 2000; Littleton & Häkkinen, 1999). Each learner taking part in collaborative learning carries out activities that trigger cognitive processes, such as induction, deduction, relation, selecting or compilation. Other activities are especially induced by the collaboration context, for example, explaining to one another, giving mutual assistance, planning, and agreement or disagreement. This learning process is beneficial for learners' knowledge construction and the development of their critical thinking, reasoning and problem solving skills (Dillenbourg, 1999; Dennen, 2000). Collaborative knowledge construction is stated as the major element to establish this sort of e-learning applications (Gomez et al., 1998; Linn & Slotta, 2000; Scardamalia & Bereiter, 1996).

A specific type of CSCL is the use of asynchronous discussion groups. Asynchronous discussions allow that the discussion sessions are not restricted by time and place as is the case with face-to-face discussions. They offer the advantage of allowing student extra time to reflect, think, and search for additional information before contributing to the discussion (De Wever, Schellens, Valcke & Van Keer, 2006; Pena-Shaff & Nivholls, 2004). Learning through discussions is one of the key aspects of the student learning experience in higher education (Ellis & Calvo, 2004). It is presented as an important strategy for good teaching (Ramsden, 1992).

Gilbert and Dabbagh (2005, p. 6) claim that "an important instructional benefit of asynchronous communication is its potential to support the co-construction of knowledge". Weinberger et al. (2005, p. 10) claim that "text-based computer-mediated communication may be a suitable context for learners to jointly explore complex problems by contributing their individual perspectives in order to acquire knowledge". However, this postulation has seldom empirically examined in a non-Western educational setting. Additionally, cultural attributes can affect online presence and learner perceptions (Wang, 2007). In literature, there is a lack of empirical studies with parallel design of student learning in CSCL environment in different cultural contexts. This study responds to this gap in the literature, and involves student samples from two different cultural settings, and investigates their

learning characteristics, perceptions, satisfaction, performance and achievement through online collaboration, and the relationship among these variables. In addition, teachers' perceptions of the instructional innovation influence the success of teaching and learning in a learning environment (Simplicio, 2004). Previous research put forth that it is also important to find out teacher views about instructional innovations and their adoption of innovative instruction (Konings, Brand-Gruwel, & van Merriënboer, 2007).

The social constructivist approach to teaching and learning

Social constructivism emphasizes the importance of culture and cultural contexts in order to understand what occurs in society (McMahon, 1997). This perspective is closely associated with many contemporary theories, most notably the learning theories of Vygotsky and Bruner, and Bandura's social cognitive theory (Shunk, 2000). Social constructivism is based on specific assumptions about reality, knowledge, and learning. Social constructivists view learning as an active and social process. Meaningful learning occurs when individuals are engaged in social activities (Ernest, 1999; McMahon, 1997). Constructivism has many faces, such as cognitive constructivism and social constructivism. In this study, we adopt a social constructivist model to stress the need for collaboration between learners (Duffy & Jonassen, 1992). It also emphasizes the importance of the relationship between the student and the instructor in the learning process. The role of teacher as a facilitator is stressed from the social constructivist viewpoint (Bauersfeld, 1995). The emphasis turns away from the instructor and the content, and moves towards the learner (Gamoran, Secada, & Marrett, 2000). This dramatic shift in focus and roles implies that a facilitator needs to display a totally different set of skills than a traditional teacher (Brownstein, 2001). Furthermore, the social constructivist viewpoint also stresses the importance to take into account the background and culture of the learner throughout the learning process, as this background helps to shape the knowledge and truth that the learner creates, discovers and attains in the learning process (Wertsch, 1997). The cultural context also affects student satisfaction with collaborative learning, either in a conventional or an e-learning environment (Kim & Bonk, 2002; Ramsay, 2005).

Constructivism has been a major conceptual framework guiding and shaping new instructional approaches (Fosnot, 1996; Wilson, 1996). This approach to learning and instruction has especially influenced the design of ICT-based learning environments (Jonassen, 1991). Wilson defines a constructivist learning environment as "a place where learners may work together and support each other as they use a variety of tools and information

resources in their guided pursuit of learning goals and problem-solving activities” (Wilson, 1996, p.5). A constructivist e-learning environment should address the critical features of constructivist pedagogy, that is, technologies should be used to keep students active, constructive, collaborative, intentional, complex, contextual, conversational, and reflective” (Jonassen, 2001).

Brandon (2004) stresses that a constructivist learning environment should provide a supportive and motivating environment in which learners can solve problems, interact with others, and assess their learning. Regardless of the particular features recommended for constructivist e-learning environments, what is emphasized over and over again is the importance of the inclusion of collaborative opportunities that allow social interaction.

Teacher variables related to the adoption of e-learning

Teacher roles

Teachers are regarded as the key factor in the adoption and success of educational innovations (Fishman & Davis, 2006). Recent educational research regarding new perspectives towards teaching has therefore focused on approaches to teaching, teaching competencies or teacher professional development, teaching style, and teacher roles. Teacher roles or their interaction models with students are a central issue. The adoption of specific teacher roles in the instructional process may facilitate or hinder students’ ability to acquire content and skills (Grasha, 1994). In an e-learning environment, new teacher roles need to be developed, such as designing and organizing the online learning context, and facilitating the online discussion and promoting student interaction (Anderson, 2004). Previous research points out that teacher perceptions of their roles are closely related to their adoption of educational innovations (Robertson, 2004).

Perspectives on the social constructivist approach to teaching and learning

Zemsky and Massy (2004) report that the main reasons for the adoption/non-adoption of e-learning in tertiary education are related to teachers’ teaching principles. Teachers differ in their conceptions of teaching and learning. Social constructivism emphasizes that learners make meaning through interactions with each other; thus emphasizing the importance of the interaction between student and instructor, and between students (Duffy & Jonassen, 1992). Previous research clearly shows that teacher conceptions of teaching principles are reflected in their teaching practices (Jonassen et al., 1995).

Perspectives on instructional innovation

The implementation of educational innovations is related to variables including teacher beliefs and practical conditions. Teachers' perceptions of teaching innovations influence their choice and realization of a learning environment (Simplicio, 2004). In recent years, e-learning, especially online collaborative learning has been applied as a dominant type of innovative instruction. The adoption of e-learning will therefore be influenced by the teachers' perspectives on the instructional innovations. More specifically, the teacher views about online collaborative learning in blended learning environments will be critical with regard to CSCL adoption.

Cultural and educational context

Learning in cultural contexts

We are what we are because of our culturally based learning (Segall, Dasen, Berry & Poortinga, 1990). According to Wolcott (1991), teaching and learning are essentially cultural transmission and cultural acquisition processes. According to this view, each culture engenders a particular style of thought and particular values, resulting in varying perceptions of learning (Pillay, Purdie, Boulton-Lewis, 2000). Woodrow (2001) suggests that culture affects assumptions about ways of learning, and even the meaning of learning may be different within different cultural contexts. Säljö (1979) also refers to a systematic cultural difference in how learning is conceptualized and the way students learn. Understanding characteristics of students from different cultural contexts is consequently important when a format of teaching is to be implemented in another cultural context (Woodrow, 2001). Teaching and learning is culturally appropriate when it takes into account the cultural context and the constraints of the educational system (Phuong-Mai, Terlouw & Pilot, 2005).

Previous research shows that when an instructional design from a Western context is implemented with little regard to the local cultural values, it might cause cultural clashes between the student traditional background and the expectations derived from a Western culture (Wolcott, 1991; Costa, 1995; Jegede, 1995; Watkins & Biggs, 1996). The use of Internet for instructional and learning purpose does not eliminate cultural obstacles (Joo, 1999).

Earlier studies also suggest that student epistemological beliefs, conceptions of learning, approaches to study, motivation and learning strategies are crucial variables with regard to student learning (Dahlin &

Watkins, 2000; Marton, Dall Alba, & Beaty, 1993; Pintrich, 2002; Schommer, 1994). In the literature, distinct differences are discussed in these variables between Chinese and Western students. For example, Chinese students are considered to have a greater tendency to remember or absorb existing “knowledge” compared to Western students (Qian & Pan, 2002), while Western education values to a larger extent “creativity” (Triandis, 1990). Compared to Western students who usually see understanding as the result of sudden insight, Chinese students typically think of understanding as a long process and see memorising and understanding as interlocking processes (Dahlin & Watkins, 2000; Marton, Wen, & Wong, 2005). Previous studies identified that student perception of the learning environment is an important factor to predict student academic performance and learning outcomes (Ramsden, 1991). Student motivation is also closely related to their social and cultural background (Iyengar & Lepper, 1999). Furthermore, computer competence also affects student achievement in e-learning activities (Lim, 2001). Therefore, in this study, we examine multiple student-related variables, and link them to their academic performance in e-learning environments.

The Chinese and Flemish cultural and educational context

Chinese culture is regarded as part of the Confucian-heritage cultures (CHC) (Baron, 1998; Smith & Smith, 1999; Watkins & Biggs, 2001). Flanders is the Dutch-speaking part of Belgium. Flemish culture inherits major elements of European culture, reflecting elements of Anglo-Saxon, French and Latin cultures. Historically, China and Flanders are typically distinguished as collectivist and individualist culture (Baron, 1998; Hofstede, 1986). Previous research indicated that individualist and collectivist cultures do not only influence people’s different senses of self, but also their cognitive processes (Triandis, McCusker, & Hui, 1990).

In collectivistic cultures, people tend to avoid conflict and use more intermediaries. Effort, persistence and obligations are considered as the determinants of what a person achieves. People are encouraged to conform to the societal demands (Pratt, 1991; Triandis, 1990). The salient characteristics of learning in the Confucian-Heritage Cultures include social-achievement orientation, diligence, attributing success to effort, a competitive spirit and a strong belief in the maxim “practice makes perfect” (Bond, 1996; Ho, 1986; Watkins & Biggs, 1996). In individualistic cultures, individual differences are respected, people are encouraged to stand out, be unique and express themselves, and to develop the tendency to question and evaluate. The latter are considered essential for learning. It has also been stressed that the two

polar positions in the cultural dimension need to be considered as two positions on a continuum. Most cultures combine elements of both collectivist and individualistic orientations.

As stressed earlier, culture is a dynamic process. Oyserman, Kemmelmeier and Coon (2002) suggest that it is better to undertake a comprehensive reassessment of individualism and collectivism within a culture rather than make *priori* assumptions based on generalizations and previous studies. Furthermore, the map of collectivism-individualism is complex and does not always yield the expected differences between societies assumed to be collectivistic or individualistic (Ben-shaul, Sharabany, & Kurman, 2004). On the other hand, despite the growing awareness of its limitations, the collectivism-individualism framework continues to be widely used in theoretical and empirical work in cross-cultural studies. In this research, we refer to this framework as a theoretical background to be tested, as well as a reference framework for discussion.

There are specific differences in the higher education systems of China and Flanders. First of all, the entry into Chinese universities is based on the outcomes of a national entrance examination, while in Flanders access to higher education is mostly free. This implies a difference in the student composition of university students in these two cultural contexts. Secondly, Chinese bachelor's education is organised during four years, while the Flemish system follows the European Bologna guidelines and takes three years at bachelor level. This implies that the first year of the university curriculum in Flanders is very subject-oriented, while in Chinese universities, the curriculum of the first two years covers a wide theoretical base. In addition, recent program reforms in Flanders have resulted in an emphasis on larger student involvement, active student engagement and the introduction of continuous assessment and evaluation practices that require students to be constantly involved in their study. Compared to this, Chinese university students experience less pressure after the initial competitive screening during the entrance examinations. Thirdly, at the end of the first year in higher education, only about 50% of the Flemish freshmen succeed; mainly due to the need for rigorous assessment during this first year. In contrast, in the Chinese system there is no need to be this selective during the first year. Almost all Chinese students can continue their studies and move to the second year at university.

During the last three decades, learning and instruction in Chinese school have been highly exam-oriented (Gu, 2008). Many Chinese parents value education as a stepping stone to develop economic opportunities and society status (Matthews, 2000). Compared to Chinese students, Flemish students are

more likely to choose their study programmes following their personal interests. The current innovation of university education in China focuses on structural reforms or a system reform and aims at adjusting the educational objectives (Ma, 2005). This reform has yet not resulted in a prevalent impact on teaching and learning practices. Chinese teachers still stress systematic knowledge transmission, and teacher-centred approaches are the norm in Chinese universities. In Flemish universities, the social constructivist learning approach has been accepted in various ways since the late 1990s, especially when adopting innovative teaching and learning approaches such as e-learning in general and computer-based collaborative learning more specifically.

Research design and overview of this dissertation

Research setting and design

The studies set up in the context of this PhD have been set up as part of a cross-cultural research collaboration between Ghent University in Flanders and Beijing Normal University (BNU) in Beijing, China. A course on “Instructional Sciences” was chosen as the curriculum base for the e-learning implementation in both settings. This course focuses on some major learning and instructional theories and concepts of Educational Psychology, such as behaviorism, cognitivism, constructivism, and meta-cognition. Next to the face-to-face lectures during which the major theories were presented to the students, a collaborative e-learning environment was provided to students as a communication and collaboration tool. Participants in this study are consistently first-year university students studying Educational Sciences.

In order to guarantee a parallel course design in the cross-cultural comparative studies, the same handbook on “Instructional Sciences” (Dutch and Chinese version), the same e-learning platform and similar online asynchronous discussion tasks, the same group formation, procedures, instruments, etc. were implemented in both contexts. The parallel design was set up during three consecutive academic years. In order to promote student collaboration, students were assigned into groups of six to ten students to work on discussion tasks online.

Before and after a specific study period based on the e-learning implementation, surveys and interviews have been administered. Figure 2 depicts the research scheme of this study and summarizes the actors, processes and variables playing a role in the research framework.

Research questions

On the base of the theoretical background and the three research perspectives introduced above, five main research objectives were defined in order to structure study of the different student and teacher variables with regard to the e-learning implementation in higher education.

More specifically, six empirical studies have been conducted to answer 15 research questions that can be structured along five research objectives.

Objective 1: Investigating similarities and differences in conceptions of learning, approaches to study and epistemological beliefs between Chinese and Flemish students.

Objective 2: Studying student perceptions and motivation, and how these evolve in an e-learning environment.

Objective 3: Studying the differences in student participation and satisfaction with an e-learning environment in different cultural contexts.

Objective 4: Studying the relationship between student characteristics and academic performance in an e-learning environment.

Objective 5: Studying teacher perspectives about teaching and learning in an innovative higher education context.

Table 1 presents an overview of the research questions in relation to the corresponding objectives and the chapters where the research questions have been studied.

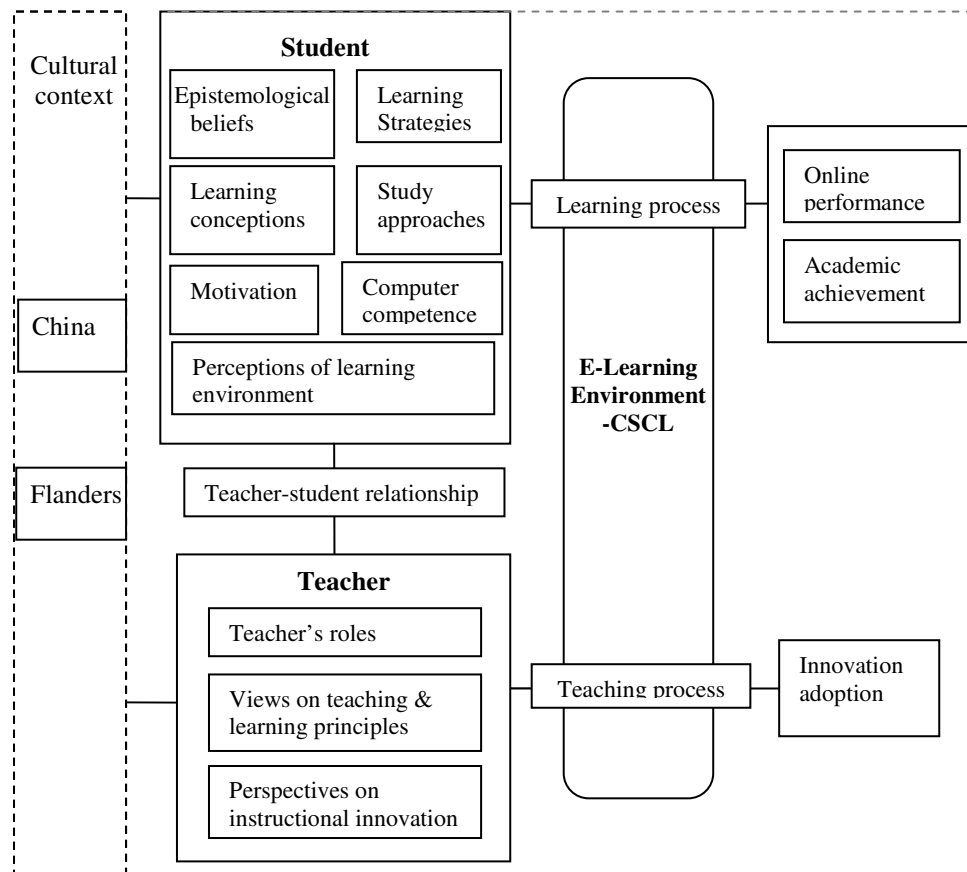


Fig. 2. Research framework to study learning and instruction in a CSCL environment

Table 1. Overview of the research questions addressed in different chapters

Objectives	Research questions	Chapters
<i>Perspective 1: student variables related to learning</i>		
OBJ1	(RQ1) What are the differences between Chinese and Flemish students in their conceptions of learning and approaches to study?	2, 3
OBJ1	(RQ2) Are there cultural differences in the relationship between conceptions of learning and approaches to study?	2, 3
OBJ1	(RQ3) Are there interaction effects between culture and knowledge domain on learning conceptions and approaches to learning?	2
OBJ1	(RQ4) Can a theoretical structural model of the relationships among epistemological beliefs, conceptions of learning, and approaches to study be applicable for pooled samples of Chinese and Flemish students?	3
OBJ1	(RQ5) Can the structural model of the relationships among epistemological beliefs, conceptions of learning, and approaches to study fit across two cultural groups?	3
<i>Perspective 2: e-learning implementation: e-learning features and student learning</i>		
OBJ2	(RQ6) What are Chinese students' perceptions of e-learning environment regarding group discussions, critical thinking, problem solving, peer learning, interaction and help seeking/provision?	4, 5
OBJ4	(RQ7) What factors affect student performance in e-learning environment?	4
OBJ2	(RQ8) Is there a cultural gap in student perceptions of online collaborative learning?	5
OBJ2	(RQ9) Is there a cultural gap regarding the evolution of student perceptions, motivation and learning strategies over time due to the actual involvement in a collaborative e-learning environment?	5
OBJ3	(RQ10) Are there cultural differences in student satisfaction and dissatisfaction with the online collaborative learning?	6
OBJ3	(RQ11) Are there cultural differences in the level of student knowledge construction through social interaction in online discussions?	6
OBJ4	(RQ12) What are the relationships between student characteristics in learning, online performance and learning outcomes?	6
<i>Perspective 3: teacher variables related to the adoption of e-learning</i>		
OBJ5	(RQ13) Are there differences in the cultural environment specifically related to teaching and learning?	7
OBJ5	(RQ14) Are there differences between Chinese and Flemish teachers regarding their perspectives on teacher roles, the social	7

	constructivist approach to teaching and learning, and online collaborative learning?	
OBJ5	(RQ15) What factors are related to teacher's adoption of e-learning?	7

Below we present an overview of the six studies and details about the research design adopted in each study (Table 2).

Table 2. Overview of the research design in each study.

	Research design & methodology	Participants (N)	Reported in
Study 1 (2004-2005 academic year)	Student survey	CN=362 FL=360	Chapter 2 ^a
Study 2 (2005-2006 academic year)	Student survey	CN=299 FL=324	Chapter 3 ^b
Study 3 (2005-2006 academic year)	E-learning intervention study Student survey & semi-structured interviews	CN=90	Chapter 4 ^c
Study 4 (2006-2007 academic year)	Parallel e-learning intervention study Student survey & semi-structured interviews	CN=165 FL=217	Chapter 5 ^d
Study 5 (2007-2008 academic year)	Parallel e-learning intervention study Student survey & semi-structured interviews	CN=160 FL=305	Chapter 6 ^e
Study 6 (2007-2008 academic year)	Teacher survey & semi-structured interviews	CN=60 FL=30	Chapter 7 ^f

RQ= research question; CN= China; FL= Flanders.

^a Published in *Learning and Individual Differences*.

^b Published in *Asia Pacific Journal of Education*.

^c Article in press in *Asia Pacific Education Review*.

^d Published in *British Journal of Educational Technology* and partly based on the article accepted for publication in *Multicultural Education and Technology Journal*.

^e Submitted for publication in *Computers & Education*.

^f Manuscript accepted for publication in *European Journal of Teacher Education*.

A note about the research methodology

Cross-cultural research faces a couple of challenges to establish the level of comparability and overcome potential bias at various levels. As suggested by Van de Vijver and Leung (1997), the interpretability of cross-cultural research can be optimized by a combination of substantive, methodological, and statistical considerations. Special attention has been paid in our study to achieve the following: (a) the conceptualization of theoretical constructs should be relevant and adequate in each cultural context; (b) a sound design of the studies should be pursued (e.g. comparability of samples, establishment of the validity of instrument in each setting and the adoption of multiple research methods (triangulation); (c) proper data analysis techniques should be applied to establish equivalence (e.g. confirmatory factor analysis). In the subsequent chapters, a more detailed description will be given about the research methodology.

Overview of the dissertation research

Chapter 2 examines the conceptions of learning and approaches to study of Chinese and Flemish students. Confirmatory factor analysis is applied to establish the validity of the research instruments in the Chinese and Flemish contexts. Results identified from the two cultural settings are discussed taking into consideration of their cultural and learning context.

Chapter 3 focuses on the relationship between epistemological beliefs and conceptions of learning and study approaches. Structural equation modeling (SEM) is applied to test the postulated relationship between epistemological beliefs and learning across the two cultural groups. This study offers valuable contributions to develop a deeper understanding of the interplay between epistemological beliefs and student learning from a cross-cultural perspective.

Chapter 4 introduces a study to examine Chinese student perceptions of an e-learning environment and factors affecting their performance by implementing an e-learning course in a Chinese setting, based on an e-learning course from the Flemish setting. During one semester of the e-learning course, students are requested to participate in 'task-based' online group discussion next to the face-to-face lectures. Student perceptions of the e-learning environment are contrasted with their perceptions of a prior conventional learning environment.

The study in chapter 5 compares Chinese and Flemish students' perceptions of online collaborative learning and their motivation and learning strategies. A parallel e-learning environment for a first-year university course on "Instructional Sciences" is implemented at Ghent University and Beijing Normal University. Student perceptions and their motivation and learning strategies are compared cross-culturally and the evolution of student motivation and learning strategies due to the actual involvement in such an e-learning environment is contrasted with pre and post tests.

Chapter 6 focuses on the examination of student satisfaction, learning performance and knowledge construction through online collaboration and the analysis of the relationship between student characteristics and learning performance from a cross-cultural perspective. A parallel e-learning environment with online collaborative group work is implemented both in Flanders and China. Next to the face-to-face sessions, students are assigned into groups and discuss and accomplish the assignments online. Prior to their group assignment, student characteristics such as computer access, learning conceptions, approaches to learning and learning strategies are measured. After the e-learning experience, student perceptions of collaborative learning and satisfaction with the e-learning environment are measured. The results are expected to be helpful in identifying the effects of online collaborative learning in different cultural contexts.

Chapter 7 aims to understand teacher perspectives about their roles in higher education, their views about the adoption of a social constructivist approach to teaching and learning and their adoption of online collaborative learning. Both qualitative and quantitative methods are applied. 60 Chinese and 30 Flemish university teachers participate in this study. Interview data are analyzed with ATLAS.ti 5.2 and questionnaires measuring teacher roles and their views on the cultural environment relating to the specific educational context are administered. The results are expected to shed light on the specific different and similar perspectives of the Chinese and Flemish university teachers.

The final chapter of this dissertation presents a summary of the research findings. Discussion of the results helps to consider the main findings from a broader perspective. Theoretical and practical implications are pointed out for future educational research, practice and instructional e-learning design across cultural contexts. In addition, methodological remarks concerning cross-

cultural research design and data analysis are summarized. Lastly, directions for future research are presented.

References

- Abelson, R.P. (1986). Beliefs are like possessions. *Journal for the Theory of Social Behavior*, 16, 223-50.
- Anderson, T. (2004). Teaching in an online learning context. In T. Anderson & F. Elloumni, (eds.) *Theory and Practice of Online Learning*. (pp 271-294). Athabasca: Athabasca University Press.
- Aguinis, H., & Roth, H.A. (2005). Teaching in China: Culture-based challenges. In I. Alon & J. R. McIntyre (Eds.), *Business and Management Education in China: Transition, Pedagogy, and Training* (pp. 141-164). Hackensack, NJ: World Scientific Publishing.
- Alexander, P.A., Murphy, P.K., Guan, J. & Murphy, P.A. (1998). How students and teachers in Singapore and the United States conceptualize knowledge and beliefs: Positioning learning within epistemological frameworks. *Learning and Instruction*, 8(2), 97-116.
- Alexander, S. (2001). E-learning developments and experiences. *Education & Training*, 43(4/5), 240-248.
- Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology*, 84, 261-271.
- Baron, J. (1998) *Teaching on-line across cultures*, in: A. Gooley, C. Pearson, S. Towers et al. (Eds) *Proceedings of the 3rd International Conference on Open Learning*, Brisbane, December (Brisbane, Queensland Open Learning Network), 67-72.
- Bauersfeld, H. (1995). The Structuring of the Structures: Development and Function of Mathematizing as a Social Practice. In L. P. Steffe & J. Gale (Eds.), *Constructivism in Education*. Hillsdale, New Jersey: Lawrence Erlbaum Associates Publishers.
- Ben-Shaul, T., Sharabany, R., & Kurman, J. (2004). Intimacy in close relationships as a function of three autonomy concepts and culture: Arab and Jewish women. Paper presented at the biennial meeting of the International Society for the Study of Behavioral Development. Gent, Belgium.
- Berry, J. W., Poortinga, Y. H., Segall, M. H., & Dasen, P. R. (1992). *Cross-cultural psychology: Research and applications*. Cambridge: Cambridge University Press.

- Biggs, J. (1993). What do inventories of students' learning process really measure? A theoretical review and clarification. *British Journal of Educational Psychology*, 83, 3-19.
- Bodley, J. H. (1994). *Cultural Anthropology: Tribes, states, and the global system*. Mountain View, Calif.: Mayfield Pub. Co.
- Bond, M.H. (Ed.) (1996). *The Handbook of Chinese Psychology*. Hong Kong: Oxford University Press.
- Bourdieu, P. (1977). Cultural reproduction and social reproduction. In J. Karabel & A. H. Halsey (Eds.), *Power and ideology in education* (pp. 487-511). New York: Oxford University Press.
- Brennan, R., McFadden, M., & Law, E. (2001). *Review of research. All that glitters is not gold: online delivery of education and training*. Leabrook: National Centre for Vocational Education Research.
- Case, J. M. & Marshall, D. (2004). Between deep and surface: procedural approaches to learning in engineering contexts. *Studies in Higher Education*, 29, 605-615.
- Chan, K.W. & Elliott, R.G. (2004). Relational analysis of personal epistemology and conceptions about teaching and learning. *Teaching and Teacher Education*, 20, 817-831.
- Cornell, R., & Martin, B. L. (1997). The role of motivation in Web-based instruction. In B. H. Khan (Ed.), *Web-based instruction* (pp. 93-100). Englewood Cliffs, NJ: Educational Technology Publications.
- Cortazzi, M. & Jin, L. (2001). Large Classes in China: 'good' teachers and interaction, in D. Watkins & J. Biggs (eds.) *Teaching the Chinese Learner: psychological and pedagogical perspectives*, Hong Kong: CERC, pp. 115-134.
- Costa, V.B. (1995). When science is "another world": Relationships between worlds of family, friends, school, and science. *Science Education*, 79, 313-333.
- Dahlin, B., & Watkins, D. (2000). The role of repetition in the processes of memorising and understanding: A comparison of the views of German and Chinese secondary school students in Hong Kong. *The British Journal of Educational Psychology*, 70, 65-84.
- Dahlin, Bo & Watkins, David A. (2000). The Role of Repetition in the Processes of Memorising and Understanding: A Comparison of the Views of German and Chinese Secondary School Students in Hong Kong. *British Journal of Educational Psychology*, 70 (1), 65-84.

- De Wever, B., Schellens T., Valcke, M., & Van Keer H. (2006). Content analysis schemes to analyze transcripts of online asynchronous discussion groups: A review. *Computers and Education*, 46, 6-28.
- Den Brok, P., Brekelmans, M., & Wubbels, T. (2007). Multilevel issues in research using students' perceptions of learning environments: The case of the Questionnaire on Teacher Interaction. *Learning Environments Research*, 9(3), 199-213.
- Dennen, V. P. (2000). Task structuring for online problem-based learning: A case study. *Educational Technology & Society*, 3(3), 330-336.
- Dillenbourg P. (1999). What do you mean by collaborative learning?. In P. Dillenbourg (Ed.) *Collaborative-learning: Cognitive and Computational Approaches*. (pp. 1-19). Oxford: Elsevier.
- Douglas, M. (1992). *Risk and Blame: Essays in Cultural Theory*. London: Routledge.
- Duffy, T. M., & Jonassen, D. H. (1992). Constructivism: New Implications for Instructional Technology. In T. M. Duffy & D. H. Jonassen (Eds.), *Constructivism and the Technology of Instruction: A Conversation* (pp. 1-16). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Dutton, J., Dutton, M., & Perry, J. (2002). How do online students differ from lecture students? *Journal of Asynchronous Learning Networks*, 6(1). Published online www.sloan-c.org/publications/jaln/v6n1/v6n1_dutton.asp
- Entwistle, N.J. & Ramsden, P. (1983). *Understanding Student Learning*. London, Croom Helm.
- Entwistle, N.J. (1981). *Styles of learning and teaching: An integrated outline of educational psychology for students, teachers and lecturers*. Chichester, Wiley.
- Ergul, H. (2004). Relationship Between Student Characteristics and Academic Achievement in Distance Education and Application on Students of Anadolu University. *Turkish Online Journal of Distance Education-TOJDE*, 5(2). <http://tojde.anadolu.edu.tr/tojde14/pdf/ergul.pdf>
- Fishman, B., & Davis, E. (2006). Teacher learning research and the learning sciences. In R. K. Sawyer (Ed.), *The Cambridge handbook of the learning sciences* (pp. 535-550). Cambridge: Cambridge University Press.
- Gamoran, A., Secada, W. G., & Marrett, C. B. (2000). The organizational context of teaching and learning: Changing theoretical perspectives. in M.T. Hallinan (ed.) *Handbook of sociology of education*, pp. 37-63. New York: Kluwer Academic/Plenum.
- Garner, R. & Alexander, P.A. (Eds.). (1994). *Beliefs about text and about instruction with text*. Hillsdale, NJ, Erlbaum.

- Geertz, C. (1993). *The interpretation of cultures*. London: Fontana Press.
- Gerlach, J. M. (1994). Is this collaboration? In K. Bosworth & S. J. Hamilton (Eds.) *Collaborative learning: Underlying processes and effective techniques*, San Francisco: Jossey-Bass.
- Gilbert, P. K., & Dabbagh, N. (2005). How to structure online discussions for meaningful discourse: A case study. *British Journal of Educational Technology*, 36, 5-18.
- Giroux, H. A. (2000). *Impure Acts. The Practical Politics of Cultural Studies*. New York and London: Routledge.
- Gomez, L. M., Fishman, B. J., & Pea, R. D. (1998). The CoVis project: Building a large-scale science education testbed. *Interactive learning environments*, (1-2), 59-92.
- Grasha, A.F. (1994). A matter of style: The teacher as expert, formal authority, personal model, facilitator, and delegator. *College Teaching*, 42, 142-149.
- Gu, Y (2008). Chinese learner: My lived experiences of studying in Mainland China and Australia. *Critical Perspectives on Accounting*, 19 (2), 217-221.
- Ho, D. Y. F., & Wu, M. (2001). Introduction to cross-cultural psychology. In L. L. Adler & U. P. Gielen (Eds.), *Cross-cultural topics in psychology* (pp. 3-13). Westport, CT: Praeger.
- Ho, D.Y.F. (1986). Chinese patterns of socialization: A critical review. In M.H. Bond (Ed.). *The Psychology of the Chinese People*. Hong Kong: Oxford University Press.
- Hofstede, G. (1986). Cultural Differences in Teaching and Learning. *International Journal of Intercultural Relations*, 10, 301-320.
- Iyengar S., & Lepper, M. (1999). Rethinking the value of choice: A cultural perspective on intrinsic motivation. *Journal of Personality and Social Psychology*, 76, 349-366.
- Jegede, O. (1995). Collateral learning and the eco-cultural paradigm in science and mathematics education in Africa. *Studies in Science Education*, 25, 97-137.
- Jonassen, D. H. (1991). Evaluating Constructivistic Learning. *Educational Technology*, 31, 28-33.
- Jonassen, D., Davidson, M., Collins, M., Campbell, J., & Haag, B. B. (1995). Constructivism and computer-mediated communication in distance education. *The American Journal of Distance Education*, 9(2), 7-26.
- Joo, J. E. (1999). Cultural issues of the Internet in classrooms. *British Journal of Educational Technology*, 30(3), 245-251.
- Kelly, G. (1973). *A Theory of Personality*. New York, Norton.

- Kim, K. & Bonk, C. (2006). The future of online teaching and learning in higher education: The survey says.... *Educause Quarterly*, 29(4), 22-30.
- Könings, K.D., Brand-Gruwel S. & van Merriënboer J.J.G. (2005). Towards more powerful learning environments through combining the perspectives of designers, teachers and students, *British Journal of Educational Psychology*, 75 (4) 645–660.
- Kroeber, A. L. & Kluckhohn C. (1952). *Culture: A Critical Review of Concepts and Definitions*. Peabody Museum, Cambridge, Massachusetts, United States.
- Lal, V. (2002). Cultural Difference and its influence on learning with computer-based technologies in schools. Retrieved Sep.8, 2004 from http://www.effectsproject.uts.edu.au/project_papers/3_vijendra_lal.pdf
- Lewis, R. (2000). Human activity in learning societies. Invited paper. In Young, S.SC., Greer, J., Maurer, H. & Chee, Y.S. (eds.). *Proceedings of the International Conference on Computers in Education, ICCEICCAI 2000*. Learning Societies in the new Millenium. National Tsing Hua University, Taiwan, pp. 36-45.
- Lim, C.K. (2001). Computer self-efficacy, academic self-concept, and other predictors of satisfaction and future participation of adult distance learners. *The American Journal of Distance Education*, 15(2), 41-51.
- Linn, M. C., & Slotta, J. D. (2000). How do students make sense of internet resources in the science classroom? In R. Kozma (Ed.), *Learning the Sciences of the 21st Century* (pp. 193-226). Hillsdale: Lawrence Erlbaum Associates.
- Littleton, K. & Häkkinen, P (1999). Learning Together: Understanding the Processes of Computer- Based Collaborative Learning. In: Dillenbourg, P. (ed.): *Collaborative learning, cognitive and computational approaches* (pp. 20-30). London.
- Löfström, E. & Nevgi, A. (2007). From strategic planning to meaningful learning: diverse perspectives on the development of web-based teaching and learning in higher education. *British Journal of Educational Technology*, 38(2), 312-324.
- Lonner, W. J., & Adamopoulos, J. (1997). Culture as antecedent to behavior. In J. W. Berry, Y. H. Poortinga, & J. Pandey (Eds.), *Handbook of cross-cultural psychology* (2nd ed, Vol. 1, pp. 43-84). Boston: Allyn & Bacon.
- Ma. C. (2005). Some Ideas on System Reform and Innovation in China's Higher Education. *Science Education in Higher Education*, Vol.2. Retrieved 19 August 2008 from <http://scholar.ilib.cn/A-gdlkjy200502010.html>

- Marton, F. & Säljö, R. (1976). On qualitative differences in learning (I & II). *British Journal of Educational Psychology*, 46, 4-11 & 115-127.
- Marton, F., Dall Alba, G. & Beaty, E. (1993). Conceptions of learning. *International Journal of Educational Research*, 19(3), 277-300.
- Marton, F., Watkins, D. & Tang, C. (1997). Discontinuities and continuities in the experience of learning: An interview study of high-school students in Hong Kong. *Learning and Instruction*, 7, 21-48.
- Marton, F., Wen, Q., & Wong, K. C. (2005). 'Read a hundred times and the meaning will appear ...': Changes in Chinese university students' views of the temporal structure of learning. *Higher Education*, 49, 291-318.
- Matthews, B.M. (2000). The Chinese Value Survey: An interpretation of value scales and consideration of some preliminary results. *International Education Journal*, 1 (2), 2000.
- McMahon, M. (1997, December). *Social Constructivism and the World Wide Web - A Paradigm for Learning*. Paper presented at the ASCILITE conference. Perth, Australia.
- Murphy A. (2006). *E-learning in diverse cultural contexts*. Proceedings of the 24th IASTED international conference on Internet and multimedia systems and applications. Retrieved 3 November 2007 from <http://www.actapress.com/PaperInfo.aspx?PaperID=23275>.
- Oyserman, D., Kemmelmeier, M. & Coon, H. (2002). Cultural Psychology: A New Look: Reply to Bond (2002), Fiske (2002), Kitayama (2002) and Miller (2002). *Psychological Bulletin*, 128(1), 110-117.
- Pascarella, E.T. & Terenzini, P.T. (1991). *How college affects students: Findings and insights from twenty years of research*. San Francisco: Jossey-Bass.
- Pena-Shaff, J. B., & Nicholls, C. (2004). Analyzing student interactions and meaning construction in computer bulletin board discussions. *Computers & Education*, 42, 243-265.
- Phuong-Mai, N., Terlouw, C., Pilot, A. (2005). Cooperative learning vs Confucian heritage culture's collectivism: confrontation to reveal some cultural conflicts and mismatch. *Asia Europe Journal*, 3 (3), 403-419.
- Pillay, H., Purdie, N. & Boulton-Lewis, G. (2000). Investigating cross-cultural variation in conceptions of learning and the use of self-regulated strategies. *Education Journal*, 28(1), 65-84.
- Pintrich, P. R. (2002). Future challenges and directions for theory and research on personal epistemology. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 389-414). Mahwah, NJ: Lawrence Erlbaum.

- Pintrich, P.R. & De Groot, E.V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, 82(1), 33-40.
- Pintrich, P.R. & Schrauben, B. (1992). Students' motivational beliefs and their cognitive engagement in classroom academic tasks. In D. Schunk & J. Meece (Eds.), *Student perceptions in the Classroom*. Hillsdale, N.J., Erlbaum.
- Poortinga, Y.H., & van de Vijver, F. J. R. (1987). Explaining cross-cultural differences : bias analysis and beyond. *Journal of Cross-Cultural Psychology*, 18(3), 259-282.
- Pratt, D.D. (1991). Conceptions of self within China and the United States. *International Journal of Intercultural Relations*, 15(3), 285-310.
- Qian, G., & Pan, J. (2002). A comparison of epistemological beliefs and learning from science text between American and Chinese high school students. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 365–385). Mahwah, NJ: Erlbaum.
- Ramburuth, P. (2001). Cross Cultural Learning Behaviour in Higher Education: Perceptions versus Practice. May 2001, *ultiBASE Articles*.
- Ramsay, C. (2005). Narrative from learning in reflection to learning in performance. *Management Learning*, 36(2), 219-235.
- Ramsden, P. (1991). A performance indicator of teaching quality in higher education: the course experience questionnaire. *Studies in Higher Education*, 16, 129–150.
- Ramsden, P. (1992). *Learning to teach in higher education*. London: Routledge.
- Robertson, I. (2004). Teachers at the interface: A model of implementation. Paper presented at the AARE conference, Melbourne. Retrieved 3 August 2008 from <http://www.aare.edu.au/04pap/rob04192.pdf>
- Roblyer, M.D., Dozier-Henry, O. & Burnette, A. P. (1996). Technology and multicultural education: The uneasy alliance. *Educational Technology*, 36(5), 5-12.
- Säljö, R. (1979). Learning about learning. *Higher Education*, 8, 443-451.
- Scardamalia, M., & Bereiter, C. (1996). Computer support for knowledge-building communities. In T. Koschmann (Ed.), *CSCL: Theory and practice of an emerging paradigm* (pp. 249-268). Mahwah, New Jersey: Lawrence Erlbaum Associates.

- Schommer, M. (1994). Synthesizing epistemological belief of research: Tentative understandings and provocative confusions. *Educational Psychology Review*, 6, 293–319.
- Segall, M.H., Dasen, P.R., Berry, J.W. & Poortinga, Y.H. (1990). *Human behavior in global perspective*. New York: Pergamon.
- Shunk, D. H. (2000). *Learning theories: An educational perspective* (3rd ed.). Upper Saddle River, NJ : Prentice-Hall, Inc.
- Shweder, R. A., Goodnow, J., Hatano, G., LeVine, R. A., Markus, H., & Miller, P. (1998). The cultural psychology of development: One mind, many mentalities. In W. Damon (Chief Ed.) & R. M. Lerner (Vol. Ed.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (5th ed., pp. 865-923). New York: Wiley.
- Simplicio, J.S.C. (2004). Today's teachers struggle to educate a generation of students unlike any that has ever been seen before. *Journal of Instructional Psychology*, 31(1), 71-75.
- Smith, P. J. & Smith, S. N. (1999). Differences between Chinese and Australian students: some implications for distance educators, *Distance Education*, 20(1), 64-80.
- Sorensen, E. K. & Takle, E. S. (2002). Collaborative knowledge building in Web-based learning: Assessing the quality of dialogue. *The International Journal on E-Learning*, 1(1), 28-32.
- Survey Research on e-Learning in Asian Countries – Fiscal Year 2002 (Overview) Retrieved 2 May 2008 from <http://www.elc.or.jp/aen/content/relatedInfo/report/elearning-trend-2002-overview.pdf>.
- Teh, G.P.L. & Fraser, B. J. (1994). Development and validation of an instrument for assessing the psychosocial environment of computer-assisted learning classrooms. *Journal of Educational Computing Research*, 12(2), 177-193.
- Triandis, H. C. (1990). Theoretical concepts that are applicable to the analysis of ethnocentrism. In R. W. Brislin (Ed.), *Applied cross-cultural psychology* (pp. 24–55). Newbury Park, CA: Sage Publications.
- Triandis, H. C., McCusker, C. & Hui, C. H. (1990). Multimethod probes of individualism and collectivism. *Journal of Personality and Social Psychology*, 59, 1006-1020.
- Tweed, R. G., & Lehman, D. R. (2002). Learning considered within a cultural context: Confucian and Socratic approaches. *American Psychologist*, 57, 89-99. University Press.

- Vijver, F.J.R. van de, & Leung, K. (1997). *Methods and data analysis for cross-cultural research*. Newbury Park, CA: Sage.
- Wang, M. (2007). Designing online courses that effectively engage learners from diverse cultural backgrounds. *British Journal of Educational Technology*, 38 (2), 294–311
- Watkins, D., & Biggs, J. (1996). (Eds.). *The Chinese learner: Cultural, psychological, and contextual influences*. Comparative Education Research Centre, University of Hong Kong and the Australian Council for Educational Research Ltd., Victoria, Australia.
- Watkins, D. & Biggs, J. (2001). (Eds.). *Teaching the Chinese Learners: Psychological and Pedagogical Perspectives*. Australian Council for Educational Research / Comparative Education Research Center: Melbourne / Hong Kong.
- Weinberger, A., Fischer, F., & Mandl, H. (2002). Fostering individual transfer and knowledge convergence in text-based computer-mediated communication. In G. Stahl (Ed.), *Computer support for collaborative learning: Foundations for a CSCL community: Proceedings of CSCL 2002*. Mahwah, NJ: Lawrence Erlbaum.
- Wertsch, J. V. (1997). *Sociocultural Studies of Mind*. Cambridge, Cambridge
- Whiting, B.B. (1976). The problem of the packaged variable. In *The Developing Individual in a Changing World. Historical and Cultural Issues*. (Eds.). K Reigel, J Meacham. Chicago: Aldine.
- Wineburg, S. (1991). Historical problem solving: A study of the cognitive processes used in the evaluation of documentary and pictorial evidence. *Journal of Educational Psychology*, 83, 73–87.
- Wolcott, H. F. (1991). Propriospect and the acquisition of culture. *Anthropology and Education Quarterly*, 22 (3), 251-273.
- Woodrow, D. (2001). Cultural determination of curricula, theories and practices. *Pedagogy, Culture and Society*, 9(1), 5-27.
- Zemsky, R., & Massy, W. (2004). *Thwarted innovation: What happened to e-learning and why*. The Learning Alliance at the University of Pennsylvania. Retrieved from <http://www.irhe.upenn.edu/WeatherStation.html>.
- Ziguras, C. (1999). Cultural diversity and transnational flexible delivery. In Winn, J. (Eds.) *ASCILITE99 - Responding to Diversity: Proceedings from the 16th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education*, Brisbane: Queensland University of Technology, 401-407.

Chapter 2

A cross-cultural study of Chinese and Flemish university students: Do they differ in learning conceptions and approaches to learning? *

Abstract

This paper reports findings with regard to learning conceptions and approaches to learning of Flemish and Chinese students. The Conceptions of Learning Inventory (COLI) and the Approaches and Study Skills Inventory for Students (ASSIST) were administered to first-year university students from China ($n=362$) and Flanders ($n=360$). The 3-factor model of the ASSIST and a modified 4-factor model of the COLI were fitted across the cultural groups. The results revealed that Chinese students reflected to a greater extent the conceptions of learning that stress understanding, personal change and development of social competence as compared to Flemish students. No differences were found with regard to their conception of learning as remembering. Approaches to learning were dependent on the learning context. Correlations between learning conceptions and approaches were identified, with some variations between the two groups. It appears that both cultural and learning contexts need to be considered to understand variables related to student learning.

Introduction

Teaching and learning “meet” in the teaching and learning environment (Schneider, 1995), and is essentially cultural transmission and culture acquisition processes (Wolcott, 1991). Previous research indicates that how students learn is affected by their cultural traditions and beliefs (Bourdieu, 1977; Tweed & Lehman, 2002; Woodrow, 2001). Furthermore, the way in which learners approach learning situations is contingent to how they perceive learning (Marton & Booth, 1997). Research suggests that there seems to be systematic cultural differences in how learning is conceptualized (Säljö, 1979). Cultural traditions and beliefs are not only related to social behaviors and

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interests but do also affect assumptions about the way to learn, and the conception of learning (Woodrow, 2001). This is stressed by Aguinis & Roth (2005) who state that cultural influences are a key issue when considering student conceptions and learning processes.

This study investigates whether the learning conceptions and approaches to learning of Chinese and Flemish university students are different taking into account the cultural and learning context. This research problem builds on an assumption frequently put forward in the literature that the way students learn is affected by cultural traditions (Kelly, 1973; Säljö, 1979; Woodrow, 2001). In this view, each culture engenders a particular style of thought and particular values, resulting in varying perceptions of learning (Pillay, Purdie, Boulton-Lewis, 2000).

Conceptions of learning and approaches to learning

Learning means different things to different people. Conceptions of learning have been explored mainly in terms of “cognitive process”, “motivation”, and “behavior change”. The acquiring, knowing and application phases of learning are most often identified, such as “acquisition of facts”, “increase of knowledge” (Säljö, 1979), “memorising and reproducing” and “applying” (Marton, Dall Alba & Beaty, 1993); “understanding” is also considered part of this cognitive process (Dahlin & Watkins, 2000; Marton, Watkins & Tang, 1997). Learning is a process that depends on experience and leads to progressive changes in potential behavior. “Changing as a person” (Marton et al., 1993, 1997), “seeing things in a different way” (Marton et al., 1993; Purdie, Hattie, & Douglas, 1996) and “development of social competence” (Purdie et al., 1996) are reflections of this potential improvement. Motivational conceptions of learning include “learning as a duty” (Cliff, 1998; Pillay et al., 2000; Purdie & Hattie, 2002) and “learning as empowerment” (Meyer, 1997). Students’ conceptions of learning seem to vary culturally (Purdie et al., 1996).

Approaches to learning have been studied in reference to how students tackle specific learning tasks within a course and “deep and surface approaches” are identified as two different levels of processing (Marton & Säljö, 1976). The two approaches are elaborated further by Entwistle (1981), Ramsden (1992), and Biggs (1987, 1993), among others. A third approach, known as achieving or strategic approach, is defined as a very well-organized form of surface approach, with a focus on attaining good marks (Entwistle & Ramsden, 1983). Previous research has generally supported the underlying structure of surface, deep, and strategic approaches to learning (Biggs, 1993). Learning approaches are often elaborated in two aspects: “motive” and

“strategy” (Biggs, 1992). Biggs emphasizes that the motive/strategy model is only meaningful in context. Empirical studies have indicated that learning approaches are context-dependent and have a procedural process (Case & Marshall, 2004). Some studies have attempted to identify additional approaches in particular contexts of knowledge domain. *Deep learning* implies the analysis of new ideas, linking them to already known concepts and principles, thus leading to understanding and long-term retention of concepts. In contrast, *surface learning* is the memorization and tacit acceptance of information as isolated facts. The deep approach correlates with an intention to understand, whereas the surface approach refers to task completion or meeting task requirements, focusing on memorizing information.

Previous research reveals that Chinese students reflect a strong sense of duty in learning and see learning as personal fulfilment (Wong, Wen & Marton, 2002; Xu, 2004). They tend to prefer memorization, but do not dominantly adopt surface approaches to learning (Biggs, 1996; Marton, Tse & Dall’Alba, 1996). Other empirical studies conclude that Asian students do not significantly differ from Western students when it comes to the adoption of a surface or deep approach (Kember & Gow, 1991; Ramburuth, 1997; Ling, Arger, Pallant, Chua & Yin, 2004). Learning approaches seem to be context-dependent (Case & Marshall, 2004). Chinese students often see memorizing and understanding as interlocking processes (Biggs, 1996; Marton & Booth, 1997), whereas other research stresses that memorizing is clearly a distinct conception of learning from understanding (Sachs & Chan, 2003). We adopt the latter position in the present study.

The literature suggests a relationship between conceptions of learning and particular learning approaches, for example, between the conception of remembering and surface approaches and between the conception of understanding and deep approaches (Watkins & Biggs, 1996). But the theoretical and empirical base is not sufficiently developed to be able to define specific causal relationships between the conceptions and approaches. Neither is it clear how this might be different in particular cultural contexts. In addition to the cultural context, we also study the learning context as an important variable to understand students’ learning conceptions and approaches.

Cultural contexts

Giroux (2000) describes culture as a site where identities are constructed. It is intrinsically pedagogical (Soetaert, Mottart & Verdoodt, 2004). Chinese culture is regarded as part of the Confucian-heritage cultures (Baron, 1998; Smith, P. & Smith, S., 1999; Watkins & Biggs, 2001). Flanders is the Dutch-speaking part of Belgium. Flemish culture inherits major elements of European culture, reflecting elements of Anglo-Saxon, French and Latin cultures... Cultural variables such as philosophical perspectives, value orientation, and motivation have an impact on learning and how learning is perceived (Marinetti & Dunn, 2002; Tweed & Lehman, 2002; Watkins, 2000). As to the traditional influence of *philosophy* for both cultures, European-Socratic philosophy favours questioning knowledge and expects students to evaluate beliefs and to generate personal hypotheses. Confucian philosophy values effortful, respectful, absorptive, and pragmatic learning, and expects learners to absorb defined knowledge (Tweed & Lehman, 2002). With regard to *values*, collectivistic cultures such as the Chinese, put forward the cardinal values of reciprocity, obligation, duty, tradition, dependence, obedience to authority, equilibrium, self-development and proper behaviour. In contrast, individualistic cultures stress creativity, bravery, self-reliance and individual responsibility as key values (Triandis, 1990). With regard to *motivation*, Niles (1995) states that 'competition' is a major motivating factor for Western students whereas for Asian students it is 'social approval'.

Learning contexts

Context is a key component both for the learning that takes place and for the learner themselves (Kelly, 2000). Students' conceptions of learning are influenced by personal experiences including cultural background, individual intentions and contextual demands. They represent a complex mix of personal motivations, beliefs and other contextual considerations. The findings of Van Rossum, Deijkers & Hammer (1985) suggest students' understanding of their actions is strongly influenced by the contexts in which such actions are performed. Learning is a cognitive process, but it is also context-bound (Verlot & Pinxten, 2000). The knowledge domain is a key factor in the learning context. The context-dependent nature of learning approaches emphasized that deep and surface approaches would have different manifestations in different knowledge domains (Entwistle, 1997; Ramsden, 1988), and students can adopt different approaches at different time or according to different

requirements of subjects (Atherton, 2003). Significant differences have been detected between learning conceptions and approaches of students from different knowledge domains (Desmedt & Valcke, 2004; Ling et al., 2004).

The Chinese and Flemish learning contexts reflect specific differences. For Chinese students, national entry examinations are an important issue in view of university access. Compared to Chinese students, Flemish students have easier access to university. But, recent program reforms have resulted in a more intensive student involvement, requiring active student engagement and introducing continuous assessment and evaluation practices that require students to be constantly busy with their study. This has resulted in a tougher screening of Flemish university freshmen, leading to a success ratio of approximately 50%. Compared to this, Chinese university students endure competitive entry screening, but experience less pressure after starting their university study program. If we compare the curriculum of the study programs in both cultural contexts, we notice that they are quite similar in terms of the main course contents, but there are differences in their teaching and learning approaches.

In the research design, cultural context and knowledge domain (as an indicator of the learning context) are taken as two independent variables to examine their particular effects and interaction effect on students' conceptions and approaches to learning (see Fig. 1).

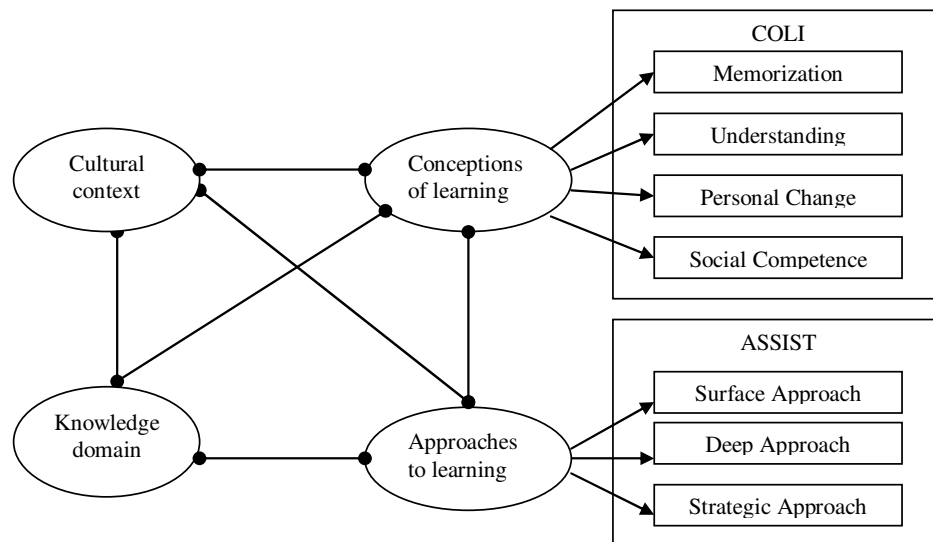


Figure1. Conceptual base of the present study. The ASSIST and COLI are presented as instrumental elaborations of the learning conceptions and approaches to learning.

Research questions

Although considerable interest has been paid in the literature to Chinese students' learning conceptions and approaches to learning, there is a lack of empirical studies focusing on this actual group (Sachs & Chan, 2003). Furthermore, there is clearly a lack of comparative studies involving Chinese and Flemish students. This brings us to the research questions of the present study. What are the differences between Chinese and Flemish students in their conceptions of learning and approaches to study? Are there cultural differences in the relationship between conceptions of learning and approaches to study? Are there interaction effects between cultural context and knowledge domain on learning conceptions and approaches to learning?

Building on the theoretical base, we firstly hypothesized that Chinese students would perceive learning to a greater extent as remembering, personal change and social competence as compared to Flemish students. In contrast we expected that Flemish students would perceive learning more as understanding as compared to Chinese students. Secondly, addressing the potential relations between learning conceptions and approaches to learning, we expected that remembering and understanding would correlate with different approaches to learning for Chinese and Flemish students. Finally, we focused on an exploratory research question about the nature of interaction effects between cultural context and knowledge domain on learning conceptions and approaches to learning.

Method*Research context and participants*

Students from the Ghent University (Flanders) and Beijing Normal University (China) and from two subject domains, Educational Sciences and Communication Studies, participated in the study. Selecting students from two different knowledge domains - but both from the social sciences - gives us the possibility to study the impact of the learning context next to the impact of cultural context and their possible interaction effects. Table 1 summarizes characteristics of the respective learning settings.

A total of 360 Flemish and 362 Chinese first-year students took part in the study. The nature and composition of the samples are presented in Table 2.

Table 1. Features of the respective learning settings concerned

	Teaching/learning methods	Use of ICT	Group work & hours of practice
Flemish Education	Emphasize learners' activity & knowledge construction via group work ++++	Multimedia, Internet (e- learning environment with asynchronous online discussion) +++	++++
Chinese Communication	Emphasize learners' activity & practice +++	Multimedia ++	+++
Flemish Communication	Emphasize learners' activity & self-learning ++	Multimedia ++	++
Chinese Education	Focus on didactic teaching +	Limited multimedia +	+

Note: The number of + indicates the degree that a certain feature has been implemented.

Table 2. Composition and background variables of sample students

	Flemish	Chinese
Knowledge domain		
Educational Sciences (N)	207	103
Communication Studies (N)	153	259
Average Age	19.35	18.94
Gender		
Male N (%)	65 (17.5%)	102 (28.1%)
Female N (%)	303 (82.5%)	261 (71.9%)

Instruments

ASSIST

The short version of Approaches and Study Skills Inventory for Students (ASSIST) (18 items) was used in this study. ASSIST is a product of many years of inventory development work, which has taken on board current literature on student learning in higher education (Tait, Entwistle, & McCune, 1998). Data were gathered using the ASSIST questionnaire that contained a 5-point Likert scale on the learning approaches. Choices were from 5-completely agree to 1-completely disagree. The students were asked to indicate to what extent a specific approach is applicable to them. Three types of learning approaches are reflected in ASSIST, namely deep, surface or strategic approach.

COLI

The Conceptions of Learning Inventory (COLI) (Purdie & Hattie, 2002) was used to assess students' conceptions of learning. The COLI consists of 32 statements, reflecting six subscales: (1) gaining information (INFO); (2) remembering, using and understanding information (RUU); (3) a duty (DUTY); (4) personal change (PERS); (5) a process not bound by time or place (PROC); (6) the development of social competence (SOC). Respondents indicated on a 6-point Likert scale to what extent they agree or disagree with the statements.

Translation

The two instruments were used in Chinese and Dutch as appropriate. The back-translation method (Brislin, 1986) was applied to ensure cross-cultural conceptual equivalence. Two English-Chinese and two English-Dutch bilingual experts in the field of Educational Sciences were involved and back translation was compared until the consistent meanings were obtained.

Data analysis

Confirmatory factor analysis (CFA) using structural equation modelling (SEM) was applied to fit the factor constructs with our sample groups. One-way analysis of variance (ANOVA) was run to compare subscale means for different cultural and disciplinary groups and multivariate analysis of variance

(MANOVA) was applied to test the cross effects of cultural context and knowledge domain. Chi-square analysis was applied to compare the dominant approach of students. Regression analysis was applied taking the conceptions of learning as predictors and learning approaches as dependent variables.

Results

Reliability and data model fit

Confirmatory factor analysis (CFA) using structural equation modeling (SEM) was applied to test whether the factor constructs fitted with our sample. The 3-factor model of ASSIST was confirmed with satisfactory goodness-of-fit indexes ($GFI > .9$, $RMSEA < .06$, $X^2/df < 3$). The internal reliability of the three factors was satisfactory ($\alpha > .65$). Appendix A represents the factor structural model of approaches to learning for the total sample.

The internal reliability of three subscales (INFO, DUTY and PROC) of the COLI was too low ($\alpha < .60$). These scales were not included in further analyses. The factor structure of the four subscales was tested: remembering information (MEM), understanding and using information (UND), personal change (PERS) and social competence (SOC). Item changes were made based on the modification indices (MI). The modified model resulted in three items for each factor and improved the model fit to an adequate level ($GFI > .9$, $RMSEA < .06$, $X^2/df < 3$). Appendix B depicts the factor structural model of conceptions of learning for the total sample.

Model fit analyses across the groups were conducted by testing cross-group nested hierarchical constrained models. The results showed that the Unconstrained, Measurement weights and Structural covariances models were satisfactory ($X^2/df < 3$, $CFI > .90$, $RMSEA < .05$), indicating that the model displayed measurement invariance and can be applied across groups. Introducing the equality factor means reduced the model fit, indicating that the mean of at least one variable is different between the Chinese and Flemish sample. Table 3 presents the goodness-of-fit indices for both subsamples and the total sample.

Mean level differences and similarities

The descriptive results for learning conceptions and approaches of students across cultural and knowledge domain groups are presented in Table 4. No significant differences were found between male and female students ($p > .05$).

Table 3. Goodness-of-Fit Indexes for the model of ASSIST and modified model of COLI

Indexes	ASSIST			Adapted COLI		
	Flemish group	Chinese group	Total	Flemish group	Chinese group	Total
Goodness-of-fit (GFI)	.91	.92	.92	.96	.94	.95
Adjusted goodness-of-fit (AGFI)	.89	.90	.90	.93	.90	.91
Root mean square error of approximation (RMSEA)	.037	.042	.039	.059	.064	.047
Ratio of chi-square (X^2/df)	2.57	2.26	2.41	2.29	2.96	2.62

Table 4. Factor means of learning conceptions and approaches to learning for cross-cultural and knowledge domain groups

	Mean (sd)					
	Flemish			Chinese		
	Total (n=360)	Education	Communication	Total (n=362)	Education	Communication
MEM	4.15(.86)	4.13(.92)	4.17(.77)	4.13(.92)	4.08(.78)	4.15(.97)
UND	4.65(.64)	4.69(.65)	4.59(.62)	4.97(.89)	4.79(.85)	5.04(.89)
PERS	4.65(.87)	4.63(.89)	4.67(.85)	4.93(.95)	4.69(.74)	5.02(1.01)
SOC	4.41(.78)	4.55(.77)	4.24(.74)	4.54(.94)	4.48(.82)	4.56(.98)
Surface	2.86(.66)	2.77(.61)	2.99(.71)	2.71(.84)	3.27(.80)	2.49(.75)
Deep	3.59(.55)	3.67(.52)	3.48(.58)	3.59(.64)	3.43(.62)	3.66(.64)
Strategic	3.69(.73)	3.93(.56)	3.35(.79)	3.75(.68)	3.59(.69)	3.81(.66)

MEM=remembering, UND=understanding, PERS=personal change, SOC=social competence.

The results showed that Chinese students scored significantly higher than Flemish students with regard to the conception of learning as personal change ($F_{(1,729)} = 17.04, p < .001$), and development of social competence ($F_{(1,729)} = 3.96, p < .05$). This is in line with our expectation. However, Chinese and Flemish students displayed no significant differences in the learning conception as remembering ($F_{(1,729)} = .09, p > .05$). And contrary to our expectation, Flemish students scored significantly lower in the conception of understanding than Chinese students ($F_{(1,729)} = 31.85, p < .001$).

Chinese and Flemish students did not differ in the adoption of deep and strategic approaches ($p > .05$). But Flemish students adopted to a greater extent surface approaches ($p < .01$). The patterns of learning approaches of the two groups were similar: strategic approaches were the highest, deep approaches the second highest, and surface approaches the lowest.

Correlations between conceptions and approaches to learning

Table 5 presents the correlations between learning conceptions and approaches to learning for both cultural groups. The following correlations were shared by students in both cultural contexts. The conception of understanding correlated positively with deep approaches ($p < .01$). Learning as personal change correlated positively with deep and strategic approaches, and negatively with surface approaches ($p < .05$). The conception of social competence correlated positively with deep and strategic approaches ($p < .05$).

In contrast, some clear differences were observed. The conception of remembering correlated positively with surface approaches for Flemish students ($p < .05$), but not for Chinese students. For the latter students, remembering correlated positively with deep and strategic approaches ($p < .01$). Learning as understanding correlated positively with strategic approaches and negatively with surface approaches for Chinese students. But these correlations were not significant for Flemish students. In summary, correlations between learning conceptions and approaches to learning were identified, but some differences in correlations were observed between Chinese and Flemish students.

Interaction effects of cultural context and knowledge domain

Multivariate analysis of variance (MANOVA) tests were performed with cultural context and knowledge domain as independent variables and the learning conceptions and approaches as dependent variables. Results are presented in Table 6. The multivariate tests show that cultural context,

knowledge domain, and the interaction between cultural context and knowledge domain all have a significant effect as a result of Wilk's Lambda ($p < .01$). There is a significant effect of knowledge domain on *personal change* ($F_{(3,716)} = 6.80$, $p < .01$, partial $\eta^2 = .009$). The interaction of cultural context and knowledge domain is significant on conceptions of *understanding* ($F_{(3,716)} = 8.63$, $p < .01$, partial $\eta^2 = .012$) and *social competence* ($F_{(3,716)} = 8.53$, $p < .01$, partial $\eta^2 = .012$). Considering effect sizes of 0.01 for small, 0.06 for medium, and 0.14 for large (Green, Salkind & Akey, 2000), all effects are small.

There is a significant effect of knowledge domain on *surface approaches* ($F_{(3,716)} = 23.63$, $p < .001$, partial $\eta^2 = .032$) and *strategic approaches* ($F_{(3,716)} = 11.27$, $p < .01$, partial $\eta^2 = .015$). Significant effects of interaction between cultural context and knowledge domain are observed in all dimensions of learning approaches, with a small effect on *deep approaches* ($F_{(3,716)} = 18.99$, $p < .001$, partial $\eta^2 = .026$), and a moderate effect on *strategic* ($F_{(3,716)} = 58.01$, $p < .001$, partial $\eta^2 = .075$) and *surface approaches* ($F_{(3,716)} = 78.47$, $p < .001$, partial $\eta^2 = .099$).

Table 5. Correlations between conceptions of learning and approaches to learning for Flemish and Chinese students

	MEM	UND	PERS	SOC	Deep	Strategic	Surface
MEM		.480**	.183**	.164**	.035	-.074	.109*
UND	.451**		.421**	.408**	.245**	.091	-.050
PERS	.352**	.538**		.386**	.333**	.131*	-.112*
SOC	.290**	.451**	.498**		.181**	.132*	.028
Deep	.205**	.258**	.217**	.225**		.281**	-.105*
Strategic	.149**	.224**	.229**	.269**	.564**		-.270**
Surface	-.016	-.134*	-.139**	-.021	-.057	-.232**	1

Correlations for Flemish students are presented above the diagonal, and correlations for Chinese students are presented below the diagonal.

* $p < .05$. ** $p < .01$

Discussion

In this study we have taken the learning conceptions and approaches to learning as dependent variables to study the similarities and differences of students from different cultural backgrounds, taking Chinese and Flemish university students as sample groups. The current study adds to the existing literature regarding learning conceptions and approaches, especially that of cultural comparative studies. Our study suggests that differences exist in

conceptions of learning in relation to cultural context and learning context such as knowledge domain. This adds to the argument of Pillay, Purdie & Boulton-Lewis (2000) that individuals' conceptions of learning are often influenced by their previous experiences including cultural background, their intentions and the situational demands. It supports the statement that "learning does not exist as a general phenomenon; to learn is to act within man made institutions and to adapt to the particular definitions of learning that are valid in the educational environment in which one finds oneself" (Säljö, 1987). Säljö acknowledges the differences in perceptions of learning in different social and cultural contexts.

Table 6. MANOVA results for group differences in conceptions and approaches to learning

Source	Dependent variable	F	Sig.	Partial Eta Square
Cultural context	MEM	.29	.590	.000
	UND	20.69	.000***	.028
	PERS	8.32	.004**	.01
	SOC	3.74	.047*	.005
	Surface	.001	.969	.000
	Deep	.364	.546	.001
	Strategic	1.173	.279	.002
Knowledge domain	MEM	.58	.447	.001
	UND	1.61	.205	.002
	PERS	6.80	.009**	.009
	SOC	2.95	.086	.004
	Surface	23.63	.000***	.032
	Deep	.198	.656	.000
	Strategic	11.27	.001**	.015
Cultural context * Knowledge domain	MEM	.064	.800	.000
	UND	8.63	.003**	.012
	PERS	3.84	.051	.005
	SOC	8.53	.004**	.012
	Surface	78.47	.000***	.099
	Deep	18.99	.000***	.026
	Strategic	58.01	.000***	.075

** $p < .01$. *** $p < .001$.

The impact of the cultural context

Our study suggests that both similarities and differences can be observed when looking at learning conceptions and approaches to learning of students in different cultural contexts. As predicted, Chinese students reflected to a greater extent conceptions of learning that stress personal change and social competence. Traditionally in the Chinese context, learning and passing examinations have been considered as a means of changing personal life circumstances and springboards for achieving a higher social status (Matthews, 2000; Xu, 2004). This conforms to the view of Chinese students that value learning as a means of self-development and social approval.

However, and in contrast to our expectations, there were no significant differences regarding the conception of learning as remembering between the two groups. In addition, Chinese students also reflected to a greater extent that they view learning as understanding. This is in opposition to our theoretical assumptions. A possible explanation for this unexpected result can be found in Sachs and Chan (2003). They state that Chinese students do not consider memorization to be in sharp opposition to learning for understanding. Our findings clearly suggest that the conception of learning as remembering is not related to surface approaches for Chinese students. This can be linked to what other authors have called the “Chinese paradox”. On the one hand Chinese learners rely heavily on memorization, but they clearly also look for better understanding (Watkins, 2000). This paradox can be partially solved by the reflection that high achieving Chinese students make a distinction between mechanical memorization (rote learning) and memorization in view of understanding (Marton et al, 1993). This can help to explain why the learning approaches of Flemish and Chinese students are less different than expected. Chinese students adopted to the same extent deep learning approaches as Flemish students. Also unexpected was the higher adoption of a surface learning approach by Flemish students. This can be explained by referring to the more selective nature of the first year at Flemish universities.

The impact of the learning context

Our results indicate that knowledge domain as well as the interaction between cultural context and knowledge domain has an impact on learning conceptions and approaches. The results support previous findings that students adopt different approaches according to the differing requirements of the subject matter (Desmedt & Valcke, 2004; Ling et al., 2004). The significant interaction effect of knowledge domain and cultural context indicates that

different learning approaches have been adopted by Flemish and Chinese students in each knowledge domain. For example, Chinese Education students tended to adopt to a greater extent the surface approach than Flemish Education students; while this was the other way around for Communication students. Flemish Education students adopted to a greater extent the strategic approach than Chinese students, and it was the opposite way for Communication students. These interaction effects suggest that a particular knowledge domain might be approached differently in the two different cultural contexts and that other variables have to be considered to explain the differences observed in this study. As suggested earlier, the same knowledge domain can be implemented in a significantly different way in two cultural contexts depending on the learning and teaching strategies adopted. In this context it is relevant to repeat the remark about the larger workload that is invoked due to a program reform in the Flemish educational sciences curriculum. Students are now expected to be more active and continuously engaged as compared to the earlier curriculum. This instructional approach can be expected to invoke a deep learning approach of learners.

Our research results indicate that we cannot stereotype a student group by one factor. Different factors need to be considered when comparing student characteristics and designing suitable learning environments in different cultural settings. Pillay, Purdie & Boulton-Lewis (2000) put forth that investigations of how students' beliefs and practices are influenced by cultural contexts provide a sound basis for the formulation of teaching and learning practices. Atherton (2003) notes that we should not identify students with a fixed approach to study, but it is the design of learning environment that encourages students to adopt a particular approach. Mclean (2001) appealed that as educators, we need to be aware of the conceptions of learning each student brings to the learning environment.

"Learning does not exist as a general phenomenon; to learn is to act within man made institutions and to adapt to the particular definitions of learning that are valid in the educational environment in which one finds oneself" (Säljö, 1987, p.106). Based on the current results, we notice a relationship between the features of learning environment and surface and deep approaches. A constructivist or application-oriented learning environment tends to promote a deeper approach to learning, while students in a more didactic-oriented learning environment tend rather to adopt a surface approach to learning. This seems to support the assertion of Atherton (2003) that the design of the learning environment encourages students to adopt a particular approach.

However, further research with a focus on the relationship between the learning environment and approaches to learning is needed.

Implications and limitations

Dimmock (2000) raised the awareness as to the significance of culture related variables in the area of instructional design. At a theoretical level, the present study contributes to a better understanding of cross-cultural similarities and differences in terms of learning conceptions and approaches to learning. Next to the cultural context, the learning context, in this case 'knowledge domain', has been found to interact with the cross-cultural findings. At the empirical level, the current findings are helpful to support the instructional design of learning environments in view of catering for student differences in learning conceptions and approaches.

However, the results of the present study should be considered in the light of a few limitations. First, the extent to which the results can be generalized for students in similar Chinese and Flemish contexts is unclear. A generalization should depend on additional research in other academic contexts, curricula, and considering a broader range of characteristics of the learning environment. Secondly, next to the cultural and learning context, other independent variables might contribute to the differences and similarities identified in the present study. Follow-up research is needed including such additional variables in the study design.

References

- Aguinis, H., & Roth, H.A. (2005). Teaching in China: Culture-based challenges. In I. Alon & J. R. McIntyre (Eds.), *Business and Management Education in China: Transition, Pedagogy, and Training* (pp. 141-164). Hackensack, NJ: World Scientific Publishing.
- Atherton, J. S. (2003). Learning and Teaching: Deep and Surface Learning [On-line] UK. Retrieved March 20, 2006 from <http://www.dmu.ac.uk/~jamesa/learning/deepsurf.htm>
- Baron, J. (1998). Teaching on-line across cultures, in: A. Gooley, C. Pearson, S. Towers et al. (Eds) *Proceedings of the 3rd International Conference on Open Learning*, Brisbane, December (Brisbane, Queensland Open Learning Network), 67-72.
- Berry, J. W., Poortinga, Y. H., Segall, M. H., & Dasen, P. R. (2002). *Cross-cultural psychology: Research and applications*. Cambridge, UK: Cambridge University Press.

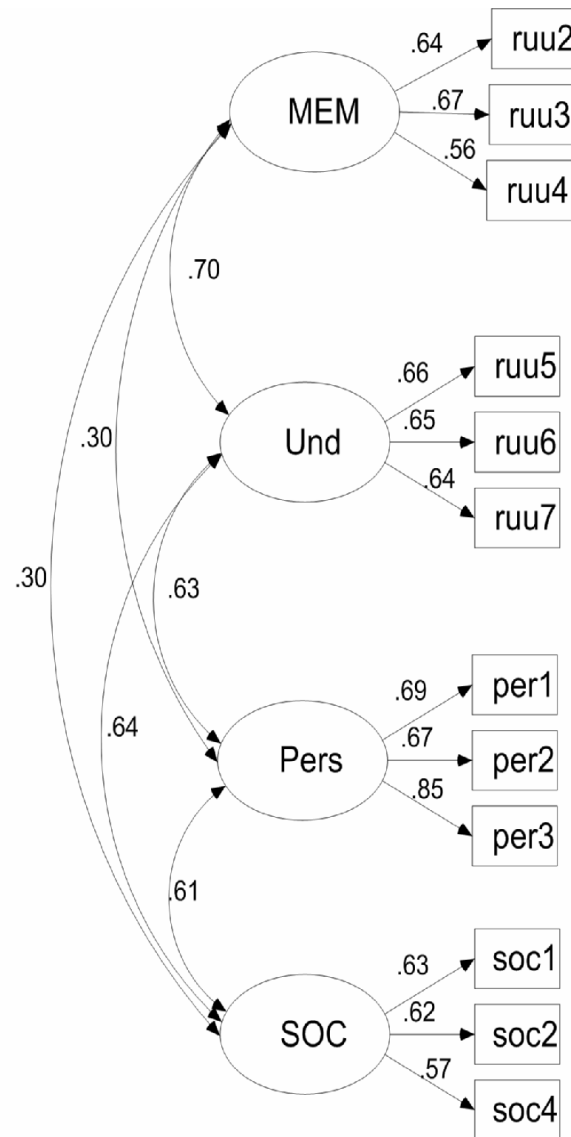
- Biggs, J. (1987). *Student Approaches to Learning and Studying*. Hawthorn, Victoria: Australian Council for Educational Research.
- Biggs, J. (1993). "What do inventories of students' learning process really measure? A theoretical review and clarification" *British Journal of Educational Psychology*, 83, 3-19.
- Biggs, J. (1996). Assessing learning quality: Reconciling institutional, staff and educational demands. *Assessment and Evaluation in Higher Education*, 21, 5-15.
- Biggs, J. (1992). A qualitative approach to grading students. *HERDSA News*, 14 (3), 3-6.
- Biggs, J.B. & Watkins, D.A. (2001). *Teaching the Chinese Learners: Psychological and Pedagogical Perspectives*. Australian Council for Educational Research / Comparative Education Research Center: Melbourne / Hong Kong.
- Bourdieu, P. (1977). *Outline of a Theory of Practice*. Cambridge: Cambridge University Press.
- Case, J. M. & Marshall, D. (2004). Between deep and surface: procedural approaches to learning in engineering contexts. *Studies in Higher Education*, 29, 605-615.
- Cliff, A. (1998). Teacher-learners' conceptions of learning: Evidence of a "communalist" conception amongst postgraduate learners? *Higher Education*, 35, 205-220.
- Dahlin, B., Watkins, D. (2000). The role of repetition in the processes of memorising and understanding: a comparison of the views of German and Chinese secondary school students in Hong Kong., *The British Journal of Educational Psychology*, 70, 65-84.
- Desmedt, E. & Valcke, M. (2004). Mapping the learning styles "Jungle"? An Overview of the literature based on Citation Analysis. *Educational Psychology*, 24, 445-464.
- Dimmock, C. (2000). *Designing the Learning Centred School-A Cross-Cultural Perspective*. RoutledgeFalmer. London & New York. 2000.
- Entwistle, N. & Ramsden, P. (1983). *Understanding student learning*. London: Croom Helm.
- Entwistle, N. (1997). Contrasting Perspectives on Learning, in: Marton, F., Hounsell, D. & Entwistle, N. eds., *The Experience of Learning*, 2nd ed. Edinburgh: Scottish Academic Press.
- Entwistle, N. (1981). *Styles of learning and teaching: An integrated outline of educational psychology for students, teachers and lecturers*. Chichester: Wiley.

- Giroux, H. A. (2000). *Impure Acts. The Practical Politics of Cultural Studies*. New York and London: Routledge.
- Green, S., Salkind, N., & Akey, T. (2000). *Using SPSS for Windows: Analyzing and understanding data*. Upper Saddle River, NJ: Prentice Hall.
- Kelly, G. (1973). *A Theory of Personality*. New York, Norton.
- Kelly, L. (2000). *Understanding Conceptions of Learning*. Proceedings from UTS Change in Educational Research Group, 2000 Annual Conference. Retrieved June 20, 2006, from <http://www.austmus.gov.au/amarc/pdf/research/paper2000.pdf>.
- Kember, D. & Gow, L. (1991). A Challenge to the Anecdotal Stereotype of the Asian Student, *Studies in Higher Education*, 16 (2), 117-128.
- Ling, P., Arger, G., Pallant, J., Chua, H. & Yin, C. (2004). Study Processes of Malaysian Students in Malaysia and in Australia. *Proceedings of the Higher Education Research and Development Society of Australasia (HERSDA 2004) Conference*, Miri, Malaysia. July, 2004.
- Marinetti, A., & Dunn, P. (2002). *Cultural adaptation: A necessity for global e-learning*. Retrieved August 25, 2005, from <http://www.learningbites.net/learningbites/main%20feature1a.htm>
- Marton, F. & Booth, S. (1997). *Learning and awareness*. Hillsdale, New Jersey: Lawrence Erlbaum Associates.
- Marton, F., & Säljö, R. (1976). On qualitative differences in learning (I and II). *British Journal of Educational Psychology*, 46, pp 4-11 and 115-127.
- Marton, F., Dall Alba, G. & Beaty, E. (1993). Conceptions of learning. *International Journal of Educational Research*, 19(3), 277-300.
- Marton, F., Dall'Alba, G. & Tse, L. K. (1996). Memorizing and understanding: the keys to the paradox? In D. A. Watkins & J. B. Biggs (Eds.) *The Chinese learner: cultural, psychological and contextual influences* (pp. 69-83). Hong Kong: Comparative Education Research Centre and The Australian Council for Educational Research.
- Marton, F., Watkins, D. & Tang, C. (1997). Discontinuities and continuities in the experience of learning: An interview study of high-school students in Hong Kong. *Learning and Instruction*, 7, 21-48.
- Matthews, B. M. (2000). The Chinese Value Survey: An interpretation of value scales and consideration of some preliminary results. *International Education Journal*, 1 (2), 117-126.
- McLean, M. (2001). Can we Relate Conceptions of Learning to Student Academic Achievement? *Teaching in Higher Education*, 6(3), 399-413.
- Meyer, J. H. F. (1997). *Conceptions of learning: Interviews with Black South African students in their mother tongue*. Paper presented at the HERDSA

- Annual Conference. Learning and teaching in higher education: Advancing international perspectives, Adelaide.
- Niles, F. S. (1995). Cultural Differences in Learning Motivation and Learning Strategies: A Comparison of Overseas and Australian Students at an Australian University. *International Journal of Intercultural Relations*, 19 (3), 369-385.
- Pillay, H., Purdie, N. & Boulton-Lewis, G. (2000). Investigating cross-cultural variation in conceptions of learning and the use of self-regulated strategies. *Education Journal*, 28(1), 65-84.
- Purdie, N. & Hattie, J. (2002). Assessing Students' Conceptions of Learning. *Australian Journal of Educational & Developmental Psychology*, 2, 17-32.
- Purdie, N., Hattie, J. Douglas, G. (1996). Student Conceptions of Learning and their Use of Self-Regulated Learning Strategies: A Cross-Cultural Comparison. *Journal of Educational Psychology*, 88 (1), 87-100.
- Ramburuth, P. (1997). *Learning Style Preferences and Approaches to Learning of International Students Studying in Australia*, Unpublished Doctoral Thesis, March 1997.
- Ramsden, P. (1988). Studying learning: Improving teaching. In Ramsden, P. (Ed), *Improving learning: new perspectives*, (Ch.2 pp13-31). Great Britain: Kogan Page.
- Ramsden, P. (1992). *Learning to Teach in Higher Education*. New York, NY: Routledge.
- Sachs, J. & Chan, C. (2003). Dual Scaling Analysis of Chinese Students' Conceptions of Learning. *Educational Psychology*, 23 (2), 181-193.
- Säljö, R. (1979). Learning about learning. *Higher Education*, 8, 443-451.
- Säljö, R. (1987). The educational construction of learning. In J. T. E. Richardson, M. W. Eysenk, & D. W. Piper (Eds.), *Student learning* (pp. 101-108). Milton Keynes: Open University Press.
- Schneider, D. K. (1995). The Learning and Teaching Environment. Retrieved February 5, 2006 from <http://tecfa.unige.ch/tecfa/research/CMC/andrea95/node4.html>
- Smith, P. J. & Smith, S. N. (1999). Differences between Chinese and Australian students: some implications for distance educators, *Distance Education*, 20(1), 64-80.
- Soetaert, R., Mottart, A., & Verdoodt, I. (2004). "Culture and Pedagogy in Teacher Education". *The Review of Education, Pedagogy & Cultural Studies*, 26 (2-3), 155-174.
- Tait, H., Entwistle, N.J. & McCune, V. (1998) "ASSIST: a reconceptualization of the approaches to study inventory", In: Rust, C., eds, *Improving Student*

- Learning (The Oxford Centre for Staff and Learning Development, Oxford Brookes University), 262-270.
- Triandis, H. C., McCusker, C. & Hui, C. H. (1990). Multimethod probes of individualism and collectivism. *Journal of Personality and Social Psychology*, 59, 1006-1020.
- Tweed, R. G., & Lehman, D. R. (2002). Learning considered within a cultural context: Confucian and Socratic approaches. *American Psychologist*, 57, 89-99.
- Van Rossum, E. J., Deijkers, R., & Hammer, R. (1985). Students' learning conceptions and their interpretation of significant educational concepts. *Higher Education*, 14, 617-641.
- Verlot, M., & Pinxten, R. (2000). Intercultural education and Complex Instruction. Some remarks and questions from an anthropological perspective on learning. *Intercultural Education*, 11, 7-15.
- Watkins, D. & Biggs, J. (2001). (Eds.). *Teaching the Chinese Learners: Psychological and Pedagogical Perspectives*. Australian Council for Educational Research / Comparative Education Research Center: Melbourne / Hong Kong.
- Watkins, D. (2000). Learning and Teaching: a cross-cultural perspective. *School Leadership & Management*, 20 (2), 161-173.
- Watkins, D., & Biggs, J. (1996). (Eds.). *The Chinese learner: Cultural, psychological, and contextual influences*. Comparative Education Research Centre, University of Hong Kong and the Australian Council for Educational Research Ltd., Victoria, Australia.
- Wolcott, H. F. (1991). Propriospect and the acquisition of culture. *Anthropology and Education Quarterly*, 22 (3), 251-273.
- Wong, K.C., Wen, Q.F. & Marton, F. (2002). The Chinese learner of Hong Kong and Nanjing, *International Studies in Educational Administration*, 30 (2), 57-79.
- Woodrow, D. (2001). Cultural determination of curricula, theories and practices. *Pedagogy, Culture and Society*. 9(1), 5-27
- Xu, R. (2004). *Chinese Mainland Students' Experiences of Teaching and Learning at a Chinese University: Some Emerging Findings*. Paper presented at the BERA 2004 Conference, Manchester.

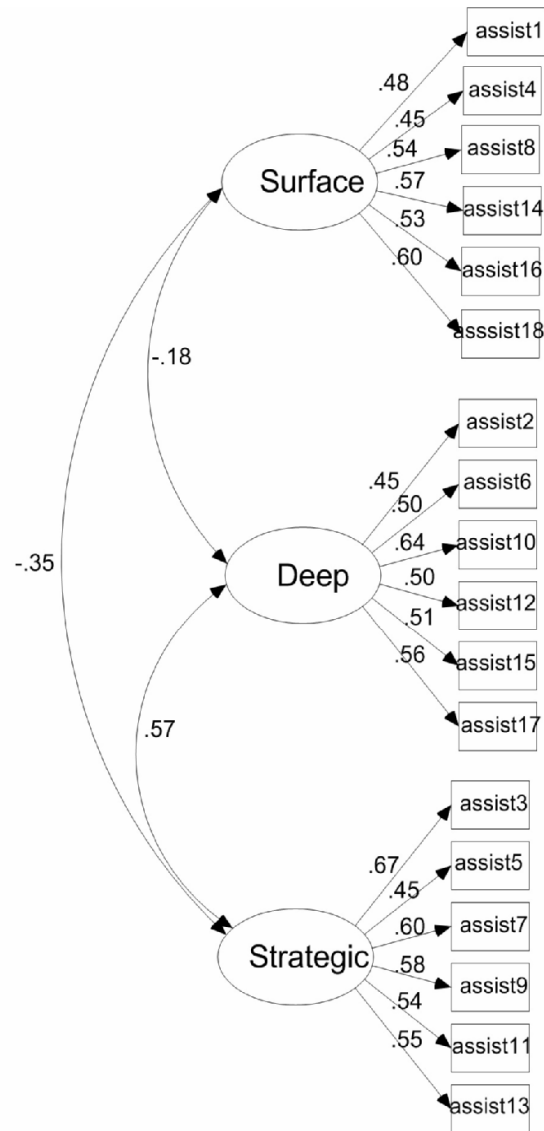
Appendix A



Standardised results of Confirmatory factor analysis of
Conceptions of learning for the total sample

GFI=.95, AGFI=.91, RMSEA=.047, $X^2/df=2.62$

Appendix B



Standardised results of Confirmatory factor analysis of approaches to learning for the total sample

GFI=.92, AGFI=.90, RMSEA=.039, $\chi^2/df=2.41$

Chapter 3

The relationship between epistemological beliefs, learning conceptions, and approaches to study: a cross-cultural structural model? *

Abstract

Recent research has shown interest in studying the relationship between epistemological beliefs and numerous aspects of learning. A new question interests us: Is this kind of relationship homogeneous across cultures? This study focuses on the relationship between epistemological beliefs, learning conceptions, and approaches to study. A sample of Chinese ($n=299$) and Flemish ($n=324$) first-year university students in Beijing, China and Flanders were involved in the study. A structural equation model (SEM) relating the three concepts was applied to the sample data, largely confirming the theoretical assumptions. The results validated the postulation that epistemological beliefs predict students' conceptions of learning, which in turn are related to specific approaches to study. Multiple group analysis using SEM was applied and the structural weights model was confirmed across the two cultural groups. Mean level variations of the three main concepts were detected between the Chinese and Flemish groups. The results identified in the study offer valuable contributions to a deeper understanding of the interplay between epistemological beliefs and student learning from a cross-cultural perspective. Implications for learning and instruction are discussed.

Introduction

Research has paid growing attention to the conditional or situational factors that shape learning experiences of students (Brown, Collins, & Duguid, 1989; Chan & Elliott, 2004). One of these factors is related to the epistemological beliefs of students (Garner & Alexander, 1994). Educational researchers have become increasingly aware of the impact of these beliefs about knowledge on learning and learning-related processes (Ryan, 1984; Wineburg, 1991). Some

* Based on Zhu, C., Valcke, M. & Schellens, T. (2008). The Relationship between epistemological beliefs, learning conceptions, and approaches to study: a cross-cultural structural model? *Asia Pacific Journal of Education*, 28 (4), 411-423.

research aimed at developing a greater understanding of the inter-relationship between student learning and culture has been conducted (Purdie, Hattie, & Douglas, 1996). Although there has been increasing attention on both theory building and empirical studies about epistemological beliefs and other aspects related to student learning, such as learning conceptions and approaches to study, the majority of them have emerged from a Western context, and there is a lack of studies from a cross-cultural perspective. In particular, there is still a lack of comprehensive empirical studies establishing the nature of the specific relationships among epistemological beliefs, learning conceptions, and approaches to study across cultural contexts.

This leads us to consider the empirical evidence for the relationships between epistemology and learning across cultural contexts. Cross-cultural research can assist us in identifying monocultural bias and develop an improved understanding of different aspects of students' learning processes. Through such research, we can identify both uniformities and consistencies in learning beliefs and behaviours, while at the same time identifying where there is systematic variation across cultural contexts (Pillay, Purdie, & Boulton-Lewis, 2000). In this study we therefore focus on: (1) understanding students' beliefs about knowledge, learning conceptions and study approaches from a cross-cultural perspective; and (2) understanding cross-cultural consistencies and variations in the pattern of relationships among these three main concepts that are related to student learning.

Epistemological beliefs, learning conceptions, and approaches to study

Research on epistemological beliefs is a growing and complex area of interest for psychologists and educators. Beliefs about the nature of knowledge and knowledge acquisition are known as epistemological beliefs (Schommer 1990; 1994). Knowledge acquisition is referred to as knowing or learning (Hofer 2000; 2001; Hofer & Pintrich 1997; Howard, McGee & Schwartz 2000; Schommer 1990; 1994).

Hofer and Pintrich (2002) have written an overview distinguishing three groups of researchers. The first are investigators interested in how individuals interpret their educational experiences (Magolda, 1987; Perry, 1970). In the second group are those who are concerned with analysing thoughts and reasoning processes (Kitchener & King, 1981). The third and most recent group is interested in studying the relationship between epistemological beliefs and numerous aspects of learning. Recent studies on epistemological beliefs refer to it as the beliefs about the nature of knowledge and knowing (Howard, McGee, Schwartz, & Purcell, 2000). Our study follows this line of research.

In Schommer's hypothetical framework, a learner who holds naive epistemological beliefs generally believes that knowledge is simple and certain, and that intelligence is innate and fixed. In contrast, a learner who holds sophisticated epistemologies believes that knowledge is tentative and evolving, and intelligence is incremental (Schommer, 1994). Schommer's approach to the study of personal epistemology has enabled researchers to more explicitly identify the relation between epistemology and learning. Although there have been attempts to revise the dimensions that constitute epistemological beliefs or to design a similar instrument (Schraw, Bendixen, & Dunkle, 2002), the Epistemological Beliefs Questionnaire remains the primary instrument for assessing personal epistemology.

Conceptions of learning have been explored mainly in terms of "cognitive processes" and "behavioural changes". As to cognitive processes, learning is often seen as "memorising and reproducing" and "understanding" (Dahlin & Watkins, 2000; Marton, Dall Alba, & Beaty, 1993). With regard to behavioural change, learning is seen as a process that depends on experience and leads to progressive changes in behaviour. "Changing as a person", "seeing things in a different way" (Marton et al., 1993) and "development of social competence" (Purdie & Hattie, 2002) are reflections of this change in behaviour. Individuals' conceptions of learning are often influenced by their previous experiences including cultural background, and present contextual factors such as intentions and situational demands (Pillay et al., 2000).

Previous research puts forward strong empirical support for three main approaches to study: surface, deep, and strategic approaches (Biggs, 1993). *Deep learning* implies the analysis of new ideas, linking them to already known concepts and principles, thus leading to understanding and long-term retention of concepts. In contrast, *surface learning* is the memorisation and tacit acceptance of information as isolated facts (Marton & Säljö, 1976). A *strategic* study approach is defined as a well-organised form of surface approach, with a focus on attaining good marks (Entwistle & Ramsden, 1983), and can be related to deep or surface approaches.

Relationship between the three concepts and a proposed structural model

The relationships among the three key concepts in the present study build on the theoretical assumption that learning is belief-driven, and therefore epistemological beliefs help to explain variations in the adoption of conceptions of learning and approaches to study (Dahl, Bals, & Turi, 2005; Pintrich, 2002; Schreiber & Shinn, 2003). These studies suggest that students'

conceptions of learning are derived from and influenced by their individual beliefs about the nature of knowledge and knowing. Research has consistently demonstrated significant relationships between epistemological beliefs and a variety of learning perceptions and strategies (Hofer, 2000). A significant relationship has been found between students' epistemological beliefs and their learning cognitions and learning strategies (Hofer, 2001).

The study by Vermunt and Vermetten (2004) demonstrates that student learning conceptions influence students' study approaches. Chan and Elliott (2004) discussed more comprehensive relationships with respect to epistemological beliefs, learning conceptions, and approaches to study. According to these studies, students who believe that knowledge is certain and unchanging regard learning rather as a simple task of memorisation and consequently adhere to a surface approach to study. In contrast, students who believe that learning requires effort and a clear process are more inclined to strive for understanding and to adopt a deep approach to study. These results indicate that epistemological beliefs affect how learning is conceptualised, which in turn affect the adoption of specific approaches to study. Earlier research also suggests an indirect effect of epistemological beliefs on approaches to study (Paulsen & Gentry, 1995; Pintrich & Schrauben, 1992).

The direct relations between learning conceptions and approaches to study have been asserted by various studies (e.g., Marton et al., 1993). According to Marton et al., there is clear evidence that learning conceptions and approaches are linked. The study of Marton et al. gives clear empirical evidence showing that students' conceptions of learning affect the way they study. Vermunt and Vermetten (2004) demonstrated that perceiving learning as the construction of knowledge is associated with a deep-oriented study strategy while perceiving learning as the intake of presented knowledge induces a more externally regulated and reproduction-oriented study strategy.

In summary, previous research on the relationships among the three concepts have three focuses: (a) the influence of epistemological beliefs on conceptions of learning (Chan & Elliot, 2004; Hofer, 2000); (b) the influence of epistemological beliefs on approaches to learning (Chan, 2003; Paulsen & Gentry, 1995); and (c) the influence of conceptions of learning on approaches to learning (Burnett, Pillay, & Dart, 2003; Marton et al., 1993). Based on the above theoretical and empirical grounds, a theoretical structural model linking the three concepts can be hypothesised (see Figure 1).

The Chinese and Flemish contexts

Watson, Ho and Raman (1994) describe culture as “the beliefs, value systems, norms, and structural elements of a given organization, tribe, or society” (p. 45). Culture affects how learning is conceptualised and the way students learn (Säljö, 1979; Woodrow, 2001). Understanding characteristics of students from different cultural contexts is especially important when a format of teaching is to be implemented in another cultural context (Zhu, Valcke, & Schellens, 2008b).

Chinese culture is regarded as part of the Confucian-heritage cultures (Baron, 1998; Watkins & Biggs, 2001). Flanders is the Dutch-speaking part of Belgium. Flemish culture inherits major elements of European culture, reflecting elements of Anglo-Saxon, French and Latin cultures. The European-Socratic philosophy favours questioning of knowledge while the Confucian philosophy values effortful, respectful and absorptive learning (Tweed & Lehman, 2002). Respect for and obedience to authority is valued by Chinese students, and effort and persistence are considered the determinants of what a person achieves. Everyone is assumed to be capable of learning (Paine, 1992; Pratt, 1991). In Western cultures, efforts are stressed less compared to personal abilities for achievement.

The educational systems of the two cultures are also different. The Chinese classrooms are very examination dominated as national entry examinations are necessary for university access. Many Chinese parents value education as a means of economic opportunity and status. Compared to Chinese students, Flemish students have easier access to university and are free to choose most of the study programmes. Teacher-centred behaviourist teaching and learning is still important in Chinese universities. Although under reform, the implementation of the constructivist teaching and learning approaches is rather limited in the Chinese educational context (Zhao, 2003). In Flemish universities, the constructivist learning approach has been promoted in various ways since the late 1990s, especially with the integration of computer-based collaborative learning.

Previous research found the expectation for Chinese students to remember or absorb existing “knowledge” is greater compared to Western students (Qian & Pan, 2002), while Western education values “creativity” more (Triandis, 1990). Compared to Western students who usually see understanding as the result of sudden insight, Chinese students typically think of understanding as a long process that requires considerable mental effort, and see memorising and

understanding as interlocking processes (Dahlin & Watkins, 2000; Marton, Wen, & Wong, 2005; Zhu, Valcke, & Schellens, 2008a).

Research questions

The present study centres on two research questions. First, can a theoretical structural model of the relationships among epistemological beliefs, conceptions of learning, and approaches to study be applicable for pooled samples of Chinese and Flemish students? A central assumption is the mediating position of the learning conceptions. We predict that epistemological beliefs affect learning conceptions, which in turn affect approaches to study.

Secondly, can the structural model of the relationships among epistemological beliefs, conceptions of learning, and approaches to study fit across two cultural groups? We expect that there will be some differences between the two cultural groups due to the different contexts as presented above.

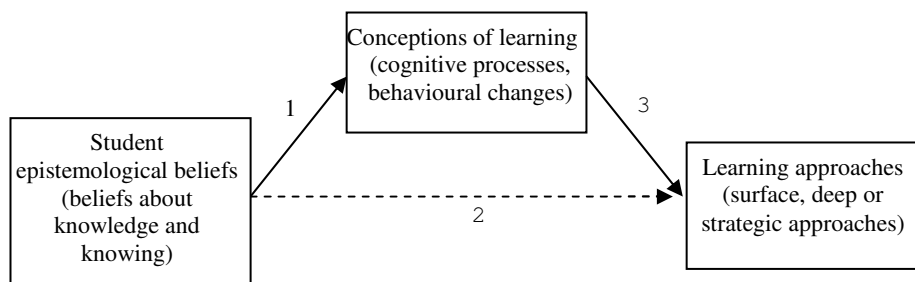


Figure 1. Conceptual model of how epistemological beliefs influence student learning.

Note. Relation 1 and 3 with solid lines represent direct relations and relation 2 with dashed lines represent indirect relations.

Method

Participants

Participants were first-year students from Beijing Normal University in China and Ghent University in Belgium. Both Chinese and Flemish students were studying Educational Sciences. The sample was composed of 299 Chinese (203 females, 96 males) and 324 Flemish (259 females, 65 males) students. The average age of the Chinese sample was 19.25 and the Flemish sample 19.45.

Procedure

Both the Chinese and Flemish students participated in the study at the start of the academic year. All participants completed a survey composed of three questionnaires. In addition, some demographic information was gathered. The survey for the Flemish students was administered online. The purpose of the research and the requirements and procedures of filling out the online questionnaires were explained at a lecture session. Reminders were sent to students by student administrators. Data from the Chinese students was collected via paper questionnaires. Arrangements were made with student administrators and students were organised in classrooms to answer the questionnaires. Those who missed the classroom sessions were asked to fill in the questionnaires afterwards and return them to the student administrators.

Instruments

Schommer's Epistemological Beliefs Questionnaire (EBQ) (Schommer, 1994) was used. Schommer defined in her theoretical framework five different epistemological belief dimensions, namely Innate/Fixed Ability, Omniscient Authority, Certain Knowledge, Simple Knowledge and Quick Learning, and the questionnaire measures these.

The Conceptions of Learning Inventory (COLI) (Purdie & Hattie, 2002) was used to measure student learning conceptions. Based on an earlier study with Chinese and Flemish students (Zhu et al., 2008a), four dimensions of conceptions of learning were validated from this questionnaire: (1) learning as remembering information; (2) learning as using and understanding information; (3) learning as personal change; and (4) learning as the development of social competence.

The short version of the Approaches and Study Skills Inventory for Students (ASSIST) (Tait, Entwistle, & McCune, 1998) was administered to the students. The ASSIST determines the level of adoption of three different types of approaches to study: surface, deep, and strategic. The ASSIST was validated by an earlier study with Chinese and Flemish samples (Zhu et al., 2008a).

Translation

Chinese and Dutch versions of the three research instruments were used. The back-translation method (Brislin, 1986) was used to ensure their cross-cultural conceptual equivalence. The instruments were translated by one bilingual expert of English-Chinese and English-Dutch separately and then translated back by another who did not know the instruments. The translations were compared and improved until a consistent translation was obtained. The authors also applied the International Test Commission standards for translating educational tests for use in various different linguistic and cultural contexts (Van de Vijver & Hambleton, 1996) as guidelines to ensure the quality.

Data analysis

First of all, the reliability of the instruments used was checked based on the current sample. In view of the first research question, the theoretical structural model, describing the relationships among epistemological beliefs, learning conceptions and approaches to study, was tested. A structural path model was drawn and tested via structural equation modelling (SEM) with the data of the pooled sample of Flemish and Chinese students. Only when this model resulted in an acceptable goodness of fit was the analysis of the second research question initiated. We carried out a hierarchical multi-group analysis to test whether and in what way the model differs significantly between the Chinese and Flemish samples.

Results

Reliability of instruments

As the constructs of the EBQ had not been tested for the cultural contexts under study, we first opted for an exploratory factor analysis (EFA) with the maximum likelihood method of factor extraction and oblimin rotation. To this end we split the present sample into two random halves. One half was used for

the EFA, and the other half for a confirmatory factor analysis (CFA). Items resulting in factor loadings lower than .30 were not retained for further analysis. Factors with fewer than three items were not retained. The remaining items resulted in a two-factor construct: Fixed Ability and Certain Knowledge. A confirmatory factor analysis was then conducted with the second half sample and the two-factor construct was confirmed. The Cronbach's alphas for the two factors were .73 and .75 for the Chinese group, and .68 and .71 for the Flemish group. The final model resulted in satisfactory goodness-of-fit indices ($GFI = .99$, $CFI = .98$, $RMSEA = .029$). As supported by Brown (2006), a reasonably good model fit is obtained when RMSEA values are close to .06 or below, and CFI values are close to .95 or greater. We used these criteria throughout this study.

The reliability and validity of the COLI was analysed with a CFA. The four-factor model resulted in acceptable goodness-of-fit indices ($GFI = .95$, $CFI = .93$, $RMSEA = .047$). The internal reliability of the four factors was satisfactory for both the Chinese and the Flemish groups (Cronbach's alphas > .70).

A CFA to test the three-factor model of ASSIST resulted in acceptable goodness-of-fit indices ($GFI = .93$, $CFI = .91$, $RMSEA = .039$). The reliability of the three factors was confirmed with our sample groups. The Cronbach's alphas for the three factors (surface, deep and strategic) were .70, .84 and .79 respectively for the Chinese students and .68, .80 and .73 for the Flemish students.

Is the proposed structural model of relationships among epistemological beliefs, learning conceptions, and approaches to study applicable to our sample students?

Based on the proposed theoretical model presented above (Figure 1), SEM was used to test the overall model in which the particular relationships among the three key concepts were established. The first test builds on the data of the total sample of students and focuses on an initial model specification including all latent constructs, and a covariance between the two exogenous latent constructs (epistemological beliefs: fixed ability and certain knowledge). The fit of the initial model was not satisfactory ($X^2 = 72.63$, $df = 18$, $GFI = .81$, $CFI = .69$, $RMSEA = .18$) and was modified based on the modification indices. Modifications involved removing insignificant paths and adding covariances between latent variables. The latter was only applied when theoretically viable. Figure 2 presents the final structural model and the significant standardised

path coefficients. This new model fitted the data well ($X^2 = 19.71$, $df = 13$, $GFI = .99$, $CFI = .99$, $RMSEA = .029$).

The final model demonstrates that students who believe more in “certain knowledge” are more likely to reflect a reproductive learning conception and tend to make greater use of surface and strategic approaches to learning. The results also indicate that students’ belief in “fixed ability to learn” explains most of the learning conceptions but in a negative manner. This can be interpreted that the less the students believe in “fixed ability to learn”, the stronger they tend to reflect both a reproductive and a constructive conception of learning. Furthermore, students with a constructive conception of learning are more likely to adopt a deep learning approach. Students who perceive learning as a means of personal change also tend to be more deep-oriented in their learning approaches. Students who perceive learning as the development of social competence seem to favour a strategic learning approach, aiming for high scores in examinations.

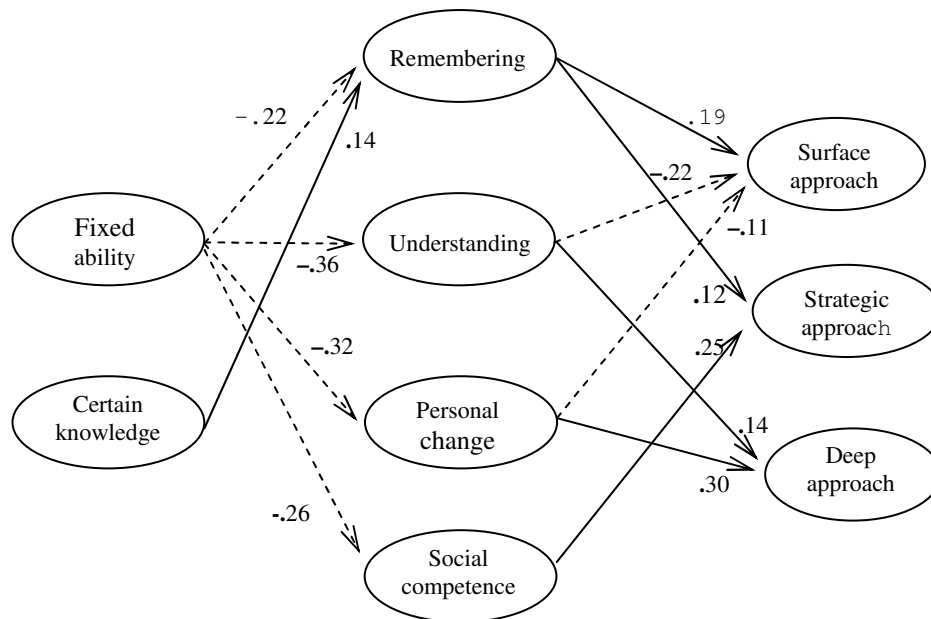


Figure 2. Final structural model of relations of epistemological beliefs, conceptions of learning, and approaches to study.

Note. Solid lines represent positive relations and dashed lines represent negative relations.

Statistically non-significant relations are not shown.

Does the structural model fit across the cultural groups and in what way do Chinese and Flemish students differ significantly?

Since a valid structural equation model did fit the data of the total sample, we proceeded to test the general model across the two cultural groups with a multi-group analysis using SEM. Nested hierarchical model comparisons were carried out. The unconstrained model was a successful fit for both groups ($X^2/df = 2.04$, $GFI = .98$, $CFI = .96$, $RMSEA = .043$). The structural weights model also fitted the data well ($X^2 = 99.2$, $df = 40$). This constrained model tests whether the relationships between the latent variables can be drawn in the same way for each cultural group in the analysis. The results indicated a structural invariance across the two groups. Assuming the structural weights model was correct, we continued to test the consecutive hierarchical models, which fitted significantly worse than the structural weights model. The model fit summary is presented in Table 1.

The results show that the general pattern of relationship between the latent variables was invariant between the two groups. However, the structural means, covariances and residuals were significantly different between the Chinese and Flemish samples.

As to the variety at covariance level, we noticed a stronger covariance between the epistemological beliefs certain knowledge and fixed ability in the Flemish student group, which implies that Flemish students more likely think that certain knowledge is associated with fixed ability compared to Chinese students. The covariance between the learning conceptions remembering and understanding was stronger for the Chinese student group. The conception of remembering had a stronger relationship with a surface approach to study for the Flemish group. The covariance between the strategic and the deep approach to study was stronger for the Chinese students.

Table 1. The model fit summary of the nested hierarchical models

Model	CMIN	df	CMIN/df	GFI	CFI	RMSEA
Measurement intercepts	65.52	28	2.34	.97	.96	.042
Structural weights	99.2	40	2.48	.97	.93	.051
Structural intercepts	166.92	52	3.21	.96	.90	.058
Structural means	234.88	64	3.67	.95	.89	.062
Structural covariance	278.76	69	4.04	.95	.87	.064
Structural residuals	471.9	78	6.05	.91	.71	.083

Note. *CMIN* = minimum sample discrepancy; *df* = degrees of freedom; *GFI* = goodness-of-fit index; *CFI* = comparative fit index; *RMSEA* = root mean square error of approximation.

Variations in epistemological beliefs, learning conceptions, and approaches to the study of Flemish and Chinese students

The mean level differences between the two cultural groups are presented in Table 2. There were significant differences between the two groups. Compared to Flemish students, Chinese students had a tendency to believe to a greater extent in “certain knowledge” and to a lesser extent in “fixed ability to learn”. Both groups were not significantly different in their conception of learning as “remembering information”. However, Chinese students reported higher levels of learning as “understanding”, “personal change” and “social competence”. While Flemish students were more likely to adopt a strategic or a surface approach to learning (with only a small effect size), both groups made use of the deep approach to learning to a similar extent.

Table 2. Means (and standard deviations) for epistemological beliefs, conceptions of learning, and approaches to study of Chinese and Flemish students

	<i>Total sample (N=623)</i>	<i>Chinese (n=299)</i>	<i>Flemish (n=324)</i>	<i>Variance ratio F</i>	<i>Significance p</i>	<i>Partial Eta Squared^a</i>
	<i>Mean (SD)</i>	<i>Mean (SD)</i>	<i>Mean (SD)</i>			
Epistemological beliefs						
Fixed ability	2.10 (.64)	1.79 (.70)	2.30 (.50)	89.94	.000***	.126 ⁺⁺
Certain knowledge	2.17 (.64)	2.27 (.71)	2.10 (.59)	8.41	.004**	.013 ⁺
Conceptions of learning						
Remembering	4.15 (.90)	4.19 (.96)	4.13 (.86)	.666	.415	.001
Understanding	4.79 (.78)	5.06 (.89)	4.61 (.64)	45.13	.000***	.068 ⁺⁺
Personal change	4.80 (.94)	5.02 (.98)	4.64 (.88)	26.21	.000***	.040 ⁺
Social competence	4.45 (.88)	4.57 (.99)	4.37 (.79)	4.13	.042*	.007
Approaches to study						
Surface approach	2.75 (.73)	2.62 (.82)	2.83 (.65)	11.39	.001**	.018 ⁺
Strategic approach	3.64 (.79)	3.57 (.90)	3.68 (.71)	10.08	.002**	.016 ⁺
Deep approach	3.55 (.66)	3.55 (.64)	3.59 (.56)	5.59	.151	.001

* $p < .05$. ** $p < .01$. *** $p < .001$.⁺ small effect size. ⁺⁺ moderate effect size.^a The effect size is considered small when partial η^2 is between 0.01 and 0.06, moderate when partial η^2 is between 0.06 and 0.14, and strong when partial η^2 is larger than 0.14 (Green, Salkind, & Akey, 2000).

Discussion

The findings derived from the present study indicate a clear relationship between epistemological beliefs, learning conceptions and approaches to study. Firstly, the structural model contributes to the development of models of student learning in higher education. The relational model enriches previous studies that only investigated the interrelationships between two of the three concepts. The results confirm that student conceptions of learning are driven by beliefs and support the suggestion of earlier research that beliefs have an indirect impact on the adoption of study approaches (Paulsen & Gentry, 1995), with conceptions of learning playing a mediating role. As the belief in “certain knowledge” has a clear effect on a reproductive learning conception and a surface approach, educators should try to develop in student a belief in “dynamic knowledge”. The belief of “fixed ability to learn” is negatively associated with student cognitions and learning strategies. A focus on “efforts” rather than “intelligence” would be helpful to foster the high level of student learning conceptions and strategies. We conclude that epistemological beliefs play a very influential role since they influence student learning conceptions and study strategies.

Secondly, fitting the model across two distinct cultures helps us to detect similarities and disparities in patterns of student learning in these two cultural contexts. The results show that Confucian effortful and absorptive learning does seem to have an impact on Chinese students’ epistemology and learning conceptions. For the Chinese students, the “intake” of knowledge still seems to be important. The Flemish students seem to question more about the source of knowledge but they give more credit to “abilities to learn” or “intelligence”.

However, we realise that the similarities in the patterns of student learning between both groups are more important than the differences between them. Both groups hold a belief of “certain knowledge” and “fixed ability” only in a limited way (with a mean lower than 3 on a scale of 1–5); both groups conceive learning as “understanding” and “personal change” as more important than “remembering”; and both groups tend to adopt more of a “deep” approach to learning than a “surface” approach.

Our study also supports the congruency studies of student characteristics and constructivist instruction. In constructivism, it is emphasised that knowledge is dynamic (Dewey, 1916). As a learning theory, constructivism emerged from the subjective turn from objectivity in epistemology (Boghossian, 2006). Epistemologically, behaviourism is grounded in objectivism, which stresses that learners acquire knowledge from outside

resources (Bichelmeyer & Hsu, 1999). Our findings suggest that in order to promote a student-centred constructivist learning approach, educators should pay more attention to the development of student beliefs about knowledge before a more constructivist approach is applied in educational practices. For example, Windschitl and Andre (1998) reported that students who had more advanced epistemological beliefs learned more through a constructivist treatment and those with less advanced beliefs learned more with an objectivist treatment. Identification of differences in student characteristics can help instructional designers develop instructional methods for specific groups of students.

On the other hand, there has been a transactional concern between epistemological beliefs and instruction (Windschitl & Andre, 1998), as instructional and learning approaches can also affect beliefs and epistemological development. A traditional “objectivist” teacher-centred instruction certainly limits or prevents student epistemological development. In order to change the “behaviourism-based” approach to instruction and learning, both teachers’ and students’ epistemologies need to be developed. Earlier studies have recommended fostering the development of epistemological beliefs through providing opportunities for students to discuss and analyse problems, engaging students in the discussion of controversial issues, and emphasising student participation (King & Kitchener, 2002). Based on this understanding, educators should on one hand design instructional methods that are suitable for students and on the other hand influence student beliefs, learning conceptions and strategies through a constructivism-oriented instructional approach.

Implications, limitations, and directions for future research

Previous studies indicate that culture plays a significant role in the conception and development of knowledge and beliefs in individuals (Youn, 2000). This influences the very notion of knowledge and beliefs prevailing within a given society. The current study fosters an increased awareness of the importance of epistemological beliefs in cognitive development (Hofer & Pintrich, 2002), and the results identified offer valuable contributions to a deeper understanding of the interplay between epistemological beliefs and student learning from a cross-cultural perspective.

A couple of limitations of the current study need to be noted. First, there is a need to test the structural model with student samples from other universities and regions. Although in this study, our sample of Chinese students from

Beijing Normal University came from various parts of China, and the Flemish sample was also from different areas in Flanders, more universities in different regions should be considered in future studies. We also recognise that the limitations of self-report surveys might have influenced our findings. Follow-up studies should try to back up these findings with conclusions based on qualitative studies. Furthermore, although the directions of the relationships proposed in our study are based on previous research theories and findings, alternative or reciprocal relations between some of the concepts studied could be tested in future studies. In future research, it might be interesting to know what type of instructional methods and academic tasks might be most conducive to fostering epistemological development, and thus to promote a deep level of constructive learning.

References

- Baron, J. (1998). Teaching on-line across cultures. In A. Gooley, C. Pearson, S. Towers et al. (Eds.), *Proceedings of the 3rd International Conference on Open Learning* (pp. 67–72). Brisbane, Australia: Queensland Open Learning Network.
- Bichelmeyer, B. & Hsu, Y. (1999). Individually-guided education and problem-based learning: A comparison of pedagogical approaches from different epistemological views. In *Proceedings of Selected Research and Development Papers Presented at the National Convention of the Association for Educational Communications and Technology (AECT)* (pp. 73–79). Houston, TX, USA. (ERIC Document Reproduction Service No. ED436135).
- Biggs, J. B. (1993). What do inventories of students' learning processes really measure? A theoretical review and clarification. *British Journal of Educational Psychology*, 63, 1–17.
- Boghossian, P. (2006). *Fear of knowledge: Against relativism and constructivism*. Oxford, UK: Oxford University Press.
- Brislin, R. W. (1986). The wording and translation of research instrument. In W. J. Lonner & J. W. Berry (Eds.), *Field methods in cross-cultural research* (pp. 137–164). Beverly Hills, CA: Sage.
- Brown, J., Collins A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, 18(1), 32–42.
- Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. New York: Guilford Press.

- Burnett, P. C., Pillay, H., & Dart, B. C. (2003). The influences of conceptions of learning and learner self-concept on high school students' approaches to learning. *School Psychology International*, 24, 54–66.
- Chan, K. W. (2003, May). Hong Kong teacher education students' epistemological beliefs and approaches to learning. *Research in Education*. Retrieved April 26, 2007, from http://findarticles.com/p/articles/mi_qa3765/is_200305/ai_n9199438
- Chan, K. W., & Elliott, R. G. (2004). Relational analysis of personal epistemology and conceptions about teaching and learning. *Teaching and Teacher Education*, 20, 817–831.
- Dahl, T. I., Bals, M., & Turi, A. L. (2005). Are students' beliefs about knowledge and learning associated with their reported use of learning strategies? *British Journal of Educational Psychology*, 75, 257–273.
- Dahlin, B., & Watkins, D. (2000). The role of repetition in the processes of memorising and understanding: A comparison of the views of German and Chinese secondary school students in Hong Kong. *The British Journal of Educational Psychology*, 70, 65–84.
- Dewey, J. (1916). *Democracy and education. An introduction to the philosophy of education*. New York: Free Press.
- Entwistle, N. J., & Ramsden, P. (1983). *Understanding student learning*. London: Croom Helm.
- Garner, R., & Alexander, P. A. (Eds.). (1994). *Beliefs about text and about instruction with text*. Hillsdale, NJ: Erlbaum.
- Green, S., Salkind, N., & Akey, T. (2000). *Using SPSS for Windows: Analyzing and understanding data*. Upper Saddle River, NJ: Prentice Hall.
- Hofer, B. K. (2000). Dimensionality and disciplinary differences in personal epistemology. *Contemporary Educational Psychology*, 25, 378–405.
- Hofer, B. K. (2001). Personal epistemology research: Implications for learning and teaching. *Educational Psychology Review*, 13, 353–383.
- Hofer, B. K., & Pintrich, P. R. (Eds.). (2002). *Personal epistemology: The psychology of beliefs about knowledge and knowing*. Mahwah, NJ: Erlbaum.
- Howard, B. C., McGee, S., Schwartz, N., & Purcell, S. (2000). The experience of constructivism: Transforming teacher epistemology. *Journal of Research on Computing in Education*, 32, 455–462.
- King, P. M., & Kitchener, K. S. (2002). The reflective judgment model: Twenty years of research on epistemic cognition. In B. K. Hofer & P. R.

- Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 37–62). Mahwah, NJ: Erlbaum.
- Kitchener, K. S., & King, P. M. (1981). Reflective judgment: Concepts of justification and their relationship to age and education. *Journal of Applied Developmental Psychology*, 2, 89–116.
- Magolda, M. B. B. (1987). The affective dimension of learning: Faculty-student relationships that enhance intellectual development. *College Student Journal*, 21, 46–58.
- Marton, F., Dall Alba, G., & Beaty, E. (1993). Conceptions of learning. *International Journal of Educational Research*, 19, 277–300.
- Marton, F., & Säljö, R. (1976). On qualitative differences in learning (I and II). *British Journal of Educational Psychology*, 46, 4–11, 115–127.
- Marton, F., Wen, Q., & Wong, K. C. (2005). ‘Read a hundred times and the meaning will appear ...’: Changes in Chinese university students’ views of the temporal structure of learning. *Higher Education*, 49, 291–318.
- Paine, L.W. (1992). Teaching and modernization in contemporary China. In R. Hayhoe & J. Pan (Eds.), *East-West dialogue in knowledge and higher education* (pp. 183–209). New York: M. E. Sharpe.
- Paulsen, M. B., & Gentry, J. A. (1995). Motivation, learning strategies, and academic performance: A study of the college finance classroom. *Financial Practice and Education*, 5(1), 78–89.
- Perry, W. G. (1970). *Forms of intellectual and ethical development in the college years: A scheme*. New York: Holt, Rinehart & Winston.
- Pillay, H., Purdie, N., & Boulton-Lewis, G. (2000). Investigating cross-cultural variation in conceptions of learning and the use of self regulated learning. *Education Journal*, 28(1), 65–64.
- Pintrich, P. R. (2002). Future challenges and directions for theory and research on personal epistemology. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 389–414). Mahwah, NJ: Lawrence Erlbaum.
- Pintrich, P. R., & Schrauben, B. (1992). Students’ motivational beliefs and their cognitive engagement in classroom academic tasks. In D. Schunk & J. Meece (Eds.), *Student perceptions in the classroom* (pp. 149–184). Hillsdale, NJ: Erlbaum.
- Pratt, D. D. (1991). Conceptions of self within China and the United States. *International Journal of Intercultural Relations*, 15, 285–310.
- Purdie, N., & Hattie, J. (2002). Assessing students’ conceptions of learning. *Australian Journal of Educational and Developmental Psychology*, 2, 17–32.

- Purdie, N., Hattie, J., & Douglas, G. (1996). Student conceptions of learning and their use of self-regulated learning strategies: A cross-cultural comparison. *Journal of Educational Psychology*, 88, 87–100.
- Qian, G., & Pan, J. (2002). A comparison of epistemological beliefs and learning from science text between American and Chinese high school students. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 365–385). Mahwah, NJ: Erlbaum.
- Ryan, M. P. (1984). Monitoring text comprehension: Individual differences in epistemological standards. *Journal of Educational Psychology*, 76, 248–58.
- Säljö, R. (1979). Learning about learning. *Higher Education*, 8, 443–451.
- Schommer, M. (1994). Synthesizing epistemological belief of research: Tentative understandings and provocative confusions. *Educational Psychology Review*, 6, 293–319.
- Schraw, G., Bendixen, L. D., & Dunkle, M. E. (2002). Development and validation of the Epistemic Belief Inventory (EBI). In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 261–275). Mahwah, NJ: Erlbaum.
- Schreiber, J. B., & Shinn D. (2003). Epistemological beliefs of community college students and their learning processes. *Community College Journal of Research and Practice*, 27(8), 699–709.
- Tait, H., Entwistle, N. J., & McCune, V. (1998). ASSIST: A reconceptualization of the approaches to study inventory. In C. Rust (Ed.), *Improving student learning* (pp. 262–270). Oxford, UK: Oxford Brookes University.
- Triandis, H. C. (1990). Theoretical concepts that are applicable to the analysis of ethnocentrism. In R. W. Brislin (Ed.), *Applied cross-cultural psychology* (pp. 24–55). Newbury Park, CA: Sage Publications.
- Tweed, R. G., & Lehman, D. R. (2002). Learning considered within a cultural context: Confucian and Socratic approaches. *American Psychologist*, 57, 89–99.
- Van de Vijver, F. J. R., & Hambleton, R. K. (1996). Translating tests: Some practical guidelines. *European Psychologist*, 1, 89–99.
- Vermunt, J. D., & Vermetten, Y. (2004). Patterns in student learning: Relationships between learning strategies, conceptions of learning, and learning orientations. *Educational Psychology Review*, 16, 359–384.

- Watkins, D., & Biggs, J. (Eds.). (2001). *Teaching the Chinese learners: Psychological and pedagogical perspectives*. Melbourne & Hong Kong: Australian Council for Educational Research & Comparative Education Research Centre.
- Watson, R. T., Ho, T. H., & Raman, K. S. (1994). Culture: A fourth dimension of group support systems. *Communications of the ACM*, 37(10), 45–55.
- Windschitl, M., & Andre, T. (1998). Using computer simulations to enhance conceptual: The roles of constructivist instruction and student epistemological beliefs. *Journal of Research in Science Teaching*, 35, 145–160.
- Wineburg, S. (1991). Historical problem solving: A study of the cognitive processes used in the evaluation of documentary and pictorial evidence. *Journal of Educational Psychology*, 83, 73–87.
- Woodrow, D. (2001). Cultural determination of curricula, theories and practices. *Pedagogy, Culture and Society*, 9, 5–27.
- Youn, I. (2000). The culture specificity of epistemological beliefs about learning. *Asian Journal of Social Psychology*, 3, 87–105.
- Zhao, Y. (2003, July). The use of a constructivist teaching model in environmental science at Beijing Normal University. *The China Papers*. Retrieved September 8, 2007, from <http://science.uniserve.edu.au/pubs/china/vol2/yezhaio.pdf>
- Zhu, C., Valcke, M., & Schellens, T. (2008a). A cross-cultural study of Chinese and Flemish university students: Do they differ in learning conceptions and approaches to learning? *Learning and Individual Differences*, 18, 120–127.
- Zhu, C., Valcke, M., & Schellens T. (2008b, January). Students' perceptions of, motivation and learning strategies in a constructivist e-learning environment: Comparing Chinese and Flemish university students. *Proceedings of the first EARLI Advanced Study Colloquium (ASC)* (pp. 208–222). Stellenbosch, South Africa: European Association for Research on Learning and Instruction.

Chapter 4

Chinese students' perceptions of an e-learning environment and factors affecting their performance: implementing a Flemish e-learning course in a Chinese educational context *

Abstract

This study was set up in a Chinese university in Beijing by implementing a Flemish e-learning course in a Chinese setting. A main feature of the e-learning environment is the asynchronous 'task-based' online group discussion. The purpose of the study is to understand Chinese students' perceptions of a collaborative e-learning environment and the factors that affect their online performance and academic achievement. The results of the study indicate that the students had less positive perceptions of the e-learning environment as compared to their perceptions of a more conventional environment. However, the students reported to a higher level of preferences of peer learning, critical thinking and problem-based learning after a one semester e-learning experience. In addition, we examined variables that might have affected students' performance in e-learning environments. The results show that students with higher motivational orientations perform better in the online group discussions.

Introduction

Education has changed tremendously with the implementation of e-learning technologies. The past decade has witnessed an accelerating adoption of e-learning technologies to assist, or in many cases, supplant traditional modes of instruction. Educators recognize the need to offer e-learning to meet the demands of the students of the 21st century. E-learning offers many advantages, such as allowing learners to learn at their own pace, and being independent of time and place. However, since e-learning is different from the conventional classroom, many students who have been successful in a

* Based on Zhu, C., Valcke, M., Schellens, T. & Li, Y. (in press). Chinese Students' perceptions of an e-learning environment and factors affecting their performance: implementing a Flemish e-learning course in a Chinese educational context. *Asia Pacific Education Review*, 10 (2), June 30, 2009.

conventional classroom learning environment (CLE) are not equally successful in the e-learning format (Cheung & Kan, 2002).

Although there is research available that studies the relationship between student characteristics and academic performance in an e-learning environment, there is currently not a comprehensive model to describe or explain what determines an effective e-learning experience (Blass & Davis, 2003). Minasian-Batmanian (2002) pointed at the critical role of computer expertise, access to technology and motivation levels. Recent studies have extended previous research about the relations between student perceptions of e-learning environment and their learning outcomes (Ginns & Ellis, 2007). The quality of student learning seems to be closely related to their perceptions of the learning environment.

In this research a collaborative e-learning environment was implemented with the focus on asynchronous group discussions with the purpose to unravel Chinese students' perception of the learning environment as compared to their conventional learning experiences and to understand what factors affect their online performance and academic achievement. Two research questions are put forward: 1) How do Chinese students perceive the e-learning environment as compared to their perception of the conventional classroom environment? 2) How are the student characteristics (a) perceptions of the learning environment, (b) motivation and learning strategies, and (c) computer competence associated with their online performance and academic achievement?

Theoretical background

Student perceptions of the learning environment

In learning environments research, student perceptions of the learning environment are considered to have a pervasive influence (Brok et al., 2007). It is, on the one hand, an important factor to evaluate the nature and quality of educational interventions (Teh & Fraser, 1994); and on the other hand, an important factor to predict student academic performance and learning outcomes (Ramsden, 1991). Student perceptions are a function of both the designed context and of students' prior experiences. Previous research indicates that when students are exposed to a particular learning context, they are differentially responsive to the learning environment, according to their perceptions of the learning environment and its requirements (Meyer & Muller, 1990). With regard to measuring the impact of the learning environment, most studies adopt the Course Experience Questionnaire (CEQ) (Ramsden, 1991). This instrument focuses on performance indicators related to teaching

effectiveness, such as good teaching, clear goals, assessment, workload, and independence. However, the CEQ does not measure student responsiveness to specific features of the learning environment. In this study, we examine students' perceptions of the e-learning environment in relation to the instructional design features that foster group discussion, problem solving, critical thinking, peer learning, interaction and help provision. The rationale for considering these elements is presented below.

Asynchronous online *discussion* is considered to support the interaction and educational flexibility of student learning, and provides students with extra time to reflect and encourages more thoughtful and reflective discussion (De Wever et al., 2006). Problem-based learning (PBL) implies that students are expected to apply the required knowledge and *problem-solving* skills to solve authentic problems during the e-learning process. Learning is enhanced when PBL and *critical thinking* is promoted through reflective activities (Hendry et al., 1999). Neo (2003) put forth that via collaborative e-learning, students are able to develop skills such as teamwork, collaboration, cooperation, and critical thinking skills. In this study, critical thinking is referred to as a critical attitude and the tendency to ask probing questions during the learning process. Student perceptions of *peer learning*, *interaction*, and *help* are also important determinants regarding student perceptions of a collaborative e-learning environment (McLoughlin & Luca, 2002).

Student perceptions of e-learning environments have been studied in other contexts (e.g., So & Brush, 2008), but studies of Chinese students' perceptions of e-learning environments are scarce, especially when e-learning is implemented from another cultural setting into a specific Chinese setting. Some earlier research has studied Chinese students' attitudes towards online discussion. For example, the study of Wang (2006) shows that overseas Chinese students are more silent, passive, formal and content-oriented in their discussions as compared to their Western classmates in the online environment. The study of Chin, Chang and Bauer (2000) indicates that Asian students prefer a teacher-centered approach and seem to be less confident in using web-based learning than Western students. Other studies indicate that in general Chinese e-learning participants are unfamiliar with online peer learning and participate in a more limited way, when it comes to group discussions between peers and with teachers (Thompson & Ku, 2005). However, there are no studies that focus on student perceptions of the specific features of the e-learning environment introduced above.

Factors affecting student online performance

Previous studies suggest that the student learning experience, the learning context and the learning outcomes are not to be seen as separate variables and processes (Marton & Booth, 1997; Prosser & Trigwell, 1999). Ramsden and Entwistle (1981) focused their studies on the relationship between the perceived characteristics of the learning environment and the influence on student learning outcomes. Next to student perceptions of the learning environment, available research shows that motivation and learning strategies are significantly correlated with student academic performance (Pintrich & Schrauben, 1992). Recent studies have also examined the relationship between motivation, learning strategies and student learning outcomes in e-learning environments (Ergul, 2004; Zimmerman, 2002). Ergul (2004) stressed that a high motivation level and self-discipline are necessary for students to be successful in e-learning.

Furthermore, studies indicate that students in an online environment need to have attained a certain computer competence level (Dutton et al., 2002). A lack of technological expertise will result in fear to work in an e-learning environment (Piotrowski & Vodanovich, 2000). Lim (2001) stated that computer competence is a statistically significant predictor of student achievement in online courses.

Research model and central research objectives

Building on the available theoretical and empirical base, the following model will be studied with regard to student perceptions of learning environments, and the relationship between mediating variables and student performance in e-learning (Figure 1).

Based on this theoretical model, we focus this study on the following two research questions. a) What are Chinese students' perceptions of e-learning environment regarding group discussions, critical thinking, problem solving, peer learning, interaction and help seeking/provision? For this question, we contrast student perceptions of e-learning environment with their perceptions of conventional face-to-face learning environment. b) What factors affect student performance in e-learning environment? For this question we examine in what way individual and situational factors, including student motivation, learning strategies, computer competence, and perceptions of the learning environment will influence student online performance and academic achievement.

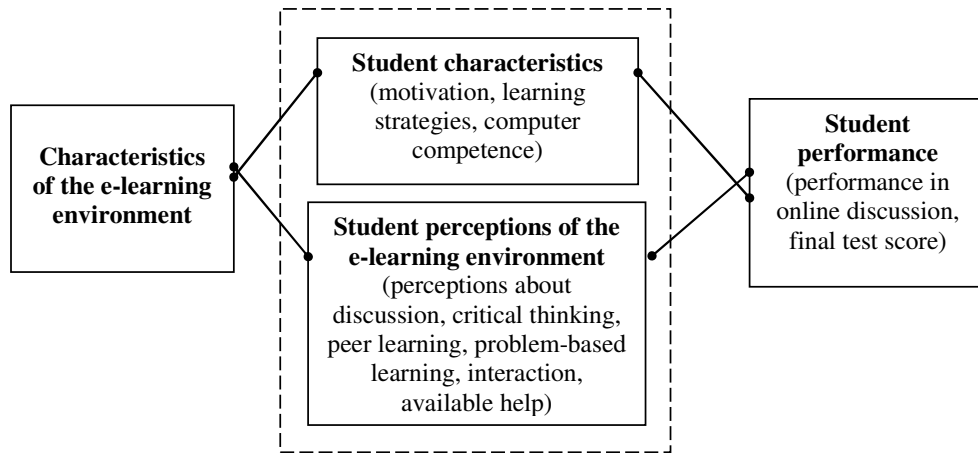


Fig.1. Conceptual model explaining the interplay between characteristics of the learning environment, student characteristics and perceptions, and student performance in an e-learning environment.

Method

Research Setting

The present study was set up as part of a cross-cultural research collaboration between Ghent University in Flanders and Beijing Normal University (BNU) in Beijing, China, focusing on the impact of blended e-learning solutions. At content level, the study builds on an “Instructional Sciences” course in the Flemish and Chinese educational contexts. In order to guarantee a parallel course design in view of the cross-cultural comparative study, the same handbook (Dutch and Chinese version), the same e-learning platform and similar online asynchronous discussion tasks were implemented in both contexts. During the face-to-face lectures, some major theories and concepts of Educational Psychology were presented to the students, such as behaviorism, cognitivism, constructivism, and meta-cognition. The e-learning environment was provided to students as a communication and collaboration tool. This implied that online group assignments were a formal part of the course. In addition, students could make use of other e-learning provisions, such as course planning, links for extra learning resources, rosters, etc.

Participants

Ninety first-year Educational Sciences students enrolled at the Faculty of Education of BNU were involved in this study and participated in the asynchronous online group discussions. The students originated from more than 20 provinces in China. More than half of the students (58%) were from urban areas, and 42% were from rural areas. The average age of the students was 19, ranging from 17-24. Sixty-eight percent of the students were female, and 32% male. Before this experiment course was implemented, all students had some experiences in using computer and Internet, but no experiences with e-learning. Informed consent was obtained from all students.

Procedure

The blended learning course was set up during a full semester. Face-to-face lectures were set up during a weekly three hour session. A course theme required two lectures to be finished. Each finalized theme was followed up by two weeks of online group discussions on the base of a specific task in relation to this course theme. The task was based on a case study or an application of the theories presented during the lectures. The online group discussions centered on three themes: behaviorism, cognitivism, and constructivism. For example, students were asked to view and analyze three websites about English language learning and asked to discuss what elements were in line or were not in line with the behaviorist theory. Students were randomly assigned to one of ten online discussion groups. Each group consisted of nine students. Beforehand, the students received a technical training about the e-learning environment and an introduction to participation in the online group discussions. Technical support was provided online and via email on demand during the complete research period. Students were required to participate in the group discussions and to contribute at least twice a week. Two teachers, responsible for the teaching of this course, took up the role as tutors to support the discussion groups. Each tutor was responsible for five groups. Tutors were not supposed to participate at content level in the discussion, but only to moderate, to encourage students and to give directions to the discussion groups. Student performance in the discussion groups was assessed on the base of qualitative and quantitative criteria. These criteria were communicated to the students during the initial training session. The total assessment score for each discussion theme is 5 (1 point for meeting the quantitative criterion; 4 points for the content quality of contributions; such as extent of argumentation, reference made to the theoretical base, adoption of the correct terminology,

etc.). At the end of the e-learning sessions, a written final assessment test was presented to the students. Both qualitative and quantitative methods were adopted for this study.

Instruments

Prior to the implementation of the e-learning course, students were requested to fill out a questionnaire (pre-test) about demographics, their experience with computers and the Internet, their motivation and learning strategies, their perceptions of their current (conventional) classroom learning environment and their preferred learning environment. At the end of the semester – a second questionnaire (post-test) was administered with similar questions, but now focusing on their perceptions of the new e-learning environment and their preferred e-learning environment.

Student perceptions of the learning environment were measured in view of the six key characteristics of the e-learning environment discussed earlier. In the pre-test (a total of 23 items), students were asked to report the extent to which a certain feature was present in their actual classroom learning environment (CLE). Next, students were asked about their perceptions of a preferred learning environment. In the post-test (a total of 25 items), students were asked to report their perceptions of the implemented e-learning environment (ELE) and their preferred learning environment. The two questionnaires were based on the same scales. All items are included in Appendix A and B. The internal reliabilities of the six subscales are reported in Table 1. All questionnaires were administered online.

In view of determining student motivation, part of the Motivated Strategies of Learning Questionnaire (MSLQ) (Pintrich et al. 1991) was administered. Internal reliability indices (Cronbach α) for the different subscales are presented in Table 2 and compared to reliability information of the same scales as used in previous research. The subscale “help seeking” was dropped from the study due to its low reliability. The subscale “peer learning” was not dropped from the analysis, but considering the lower reliability level, the related results should be handled in a cautious way.

Table 1. Internal reliability of the MSLQ subscales of the present study as compared to previous studies

Subscale	Cronbach α in present study (N=90)	Cronbach α in previous studies		
	Chinese	Pintrich et al. 1991	Australian	Pillay et al. 2000 Malaysian
Motivation				
Intrinsic Goal Orientation	.68	.74	.53	.61
Extrinsic Goal Orientation	.82	.62	.75	.77
Control of Learning Beliefs	.72	.68	.56	.56
Self-efficacy for learning and performance	.88	.93	.86	.81
Learning Strategy				
Rehearsal	.74	.69	.69	.62
Elaboration	.82	.76	.75	.76
Critical Thinking	.71	.80	.75	.74
Metacognitive Self-	.72	.79	.75	.74
Regulation				
Peer Learning	.57	.76	.47	.50
Help Seeking	.48	.52	.40	.39

Table 2. Subscales measuring student perceptions of CLE and ELE and their internal reliabilities (N=90)

Subscale	CLE			ELE		
	No. of items	Cronbach α Actual	Preferred	No. of items	Cronbach α Actual	Preferred
Discussion	5	.72	.77	6	.64	.66
Critical thinking	4	.63	.69	4	.65	.70
Peer learning	4	.64	.68	4	.65	.70
Problem-based- learning	3	.61	.62	3	.60	.63
Interaction	4	.77	.84	4	.67	.72
Help	3	.69	.79	4	.71	.74

Interviews

Semi-structured face-to-face interviews were set up with the students after the e-learning experience to explore more profoundly the perceptions of the new e-learning environment. Seventy-five students participated in the interviews; fifteen students could not participate due to scheduling conflicts. Interviews were set up following a focus group format and included a group of maximum 5 students. Each session lasted about 45 minutes to 1 hour and was audio-taped. An assistant teacher also took notes for the interviews. The focus group interviews were based on 6 guiding questions: 1) How did you like the e-learning environment in general? 2) Did you like participating in the online group discussion? 3) Do you think the online group discussions have helped you in constructing new knowledge? 4) Did your level of computer competence affect your e-learning experience? 5) What were the main problems you encountered in the e-learning experience? 6) What suggestions do you have for attaining a better e-learning experience? For each interview question, additional sub-questions were asked in case the answers were not clear or no immediate answer could be given.

Analysis

Independent t-tests were applied to analyze the differences between groups and paired t-tests were applied to analyze the differences in (1) students' perceptions of the actual learning environment versus their preferred learning environment, and (2) the differences between students' perception of the ELE versus their perceptions of the CLE. Then regression analyses were conducted to examine the relationships – depicted in Figure 1 - between motivation, learning strategies, computer competence, perceptions of the learning environment and student performance. Lastly, a coding scheme was used for labeling the interview data using the ATLAS.TI.version5.2. During the process of analyzing interview transcripts, the researchers identified main coding categories and sub-codes, such as PE for Positive Experience of the ELE, HKC for online group discussions are Helpful for Knowledge Construction, and DIFF for DIFFiculties students encountered in e-learning.

Results

Descriptive results

Student characteristics regarding their prior computer and Internet use, their reported use of the ELE, and satisfaction with the ELE are summarized in Table 3. No gender differences were found regarding student prior computer and Internet use. But significant differences were found between students from urban and rural areas regarding their prior computer and Internet use. Students from urban areas reported a higher level of competence in using the ELE; however, the satisfaction with the ELE of students from different backgrounds was not significantly different.

Table 3. Student computer and Internet competence and use of the e-learning environment

	Mean (S.D.)		p	Urban areas (n=52)	Rural areas (n=38)	p
	Male (n=29)	Female (n=61)				
Use of computer	3.36 (.57)	3.17 (.67)	.44	3.73 (.80)	2.56 (.87)	.000
Use of Internet	3.56 (.79)	3.70 (.58)	.50	4.10 (.79)	2.99 (.91)	.000
Use of the ELE	3.52 (.66)	3.41 (.75)	.58	3.69 (.72)	3.12 (.94)	.018
Satisfaction with the ELE	3.69 (.90)	3.54 (.88)	.50	3.63 (.67)	3.54 (.83)	.67

Analysis of the online participation shows that – weekly - an average of 350 threaded messages was posted in the discussion groups. This represents an average of 3.89 messages per person. Female students posted slightly more messages than male students and student from urban areas posted slightly more messages than students from rural areas, but the differences were not significant ($p>.05$).

Perceptions of the e-learning environment

Student perceptions of the e-learning environment were compared to their perceptions of the conventional learning environment. The results are depicted in Figure 2. The results of the t-tests show that the students report less positive perceptions of the actual e-learning environment compared to their perceptions of previous conventional learning environment. This is clear in relation to the

characteristics regarding group discussion, interaction, help, peer learning, and critical thinking. However, they perceived the e-learning environment more positively when it comes to problem-based-learning ($t=3.97$, $p<.05$). The results also show that the students reported to a higher level of preferences for peer learning, critical thinking, and problem-based learning ($p<.05$) after one semester of their e-learning experience. Furthermore, it is clear that students have higher expectations about a preferred e-learning environment as compared to their perceptions of the actual e-learning environment ($p<.05$ for all scales). No significant differences were found between students from urban and rural areas and between boys and girls regarding their perceptions of the learning environments ($p>.05$).

Factors affecting student performance in the ELE

Performance in online group discussions. Regression analysis results, reflecting only the significant predictors, are reported in Table 4. The results show that two motivational orientations (extrinsic motivation and control of learning beliefs) and two types of learning strategies (elaboration and rehearsal) have significant impacts on student performance in the online group discussions. The *control of learning beliefs* has a positive effect ($\beta=.55$, $t=2.48$, $p<.05$), while *extrinsic goal motivation* has a negative effect ($\beta=-.39$, $t=-2.29$, $p<.05$). *Elaboration* positively predict student performance in online discussions ($\beta=.45$, $t=2.21$, $p<.05$), while *rehearsal* is negatively associated with student performance ($\beta=-.58$, $t=-2.77$, $p<.01$). The results reveal no significant relationship between student perceptions of the e-learning environment and the performance in online group discussions ($p>.05$ for all scales). The level of computer competence has no significant effect on the performance in online group discussions ($p>.05$). However, detailed regression analyses show that familiarity with word processing has a positive relationship with the performance in online group discussions ($p<.05$).

Final test score. The analysis results point out that a high adoption level of *elaboration*, as one type of the learning strategies, has a positive effect on final test scores ($\beta=.73$, $t=2.94$, $p<.01$). However, no significant effects of motivational orientations on final test score were identified ($p>.05$). The results reveal that neither student perceptions of the e-learning environment nor computer competence is a significant predictor for the final test score ($p>.05$).

Interview results

All interview answers were categorized with a coding scheme and analyzed accordingly. The main findings are summarized on the base of the six guiding interview questions:

1) The interview results show that more than one third (35%) of the students report positive experiences with the e-learning environment by saying that “it is flexible, helpful and interactive”. Almost half of the students adopt a neutral attitude by saying that “it is a very interesting learning method, but the functions and design of the e-learning can be improved”. Only about 15% of the students was negative about it and stated that “it is not as dynamic as it should be and online discussions are time-consuming”.

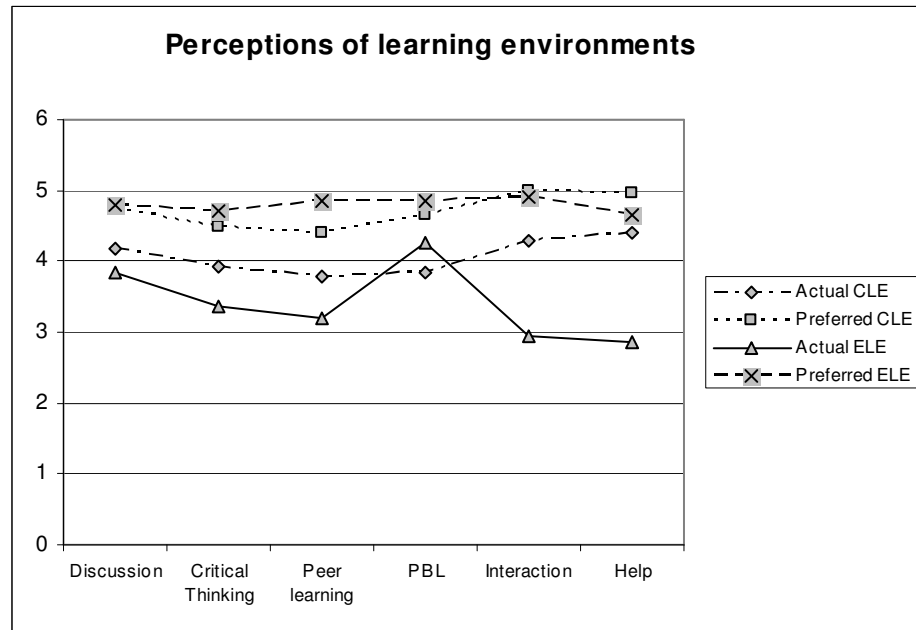
2) Almost half of the students liked the asynchronous online group discussions. However, 20% of the students thought that “the discussion topics were not interesting enough”. Some students (9%) said that they prefer face-to-face discussions “as we can get immediate feedback”.

3) One fifth of the students said that the online group discussions helped them in constructing knowledge. But it is also important to mention that about half of the students stated that they were normally used to acquire knowledge from learning materials or by listening to teachers.

4) Almost all students (95%) alleged that their prior computer competence was not a barrier for their e-learning experience. Only 4 students said that their typing skills were too restricted and that they experienced difficulties in handling the e-learning environment.

5) Some students reported that “the internet speed was too slow”. This is mainly due to the Chinese campus network that limits data flow size. Another issue reported by some students was that a lack of tutor guidance and feedback to their contributions.

6) Most students hope to get more frequent tutor guidance. Some students expect to be involved in synchronous online communication besides asynchronous online discussions. Others suggested creating more learning material links and automatic assessment, etc.



CLE= conventional learning environment, ELE= e-learning environment, PBL= problem-based learning

Figure 2. Perceptions of actual and preferred ELE and CLE.

Table 4. Significant predictors of student performance ($N=90$)

	Performance in Online group discussion			Final test score		
	β	t	p	B	t	p
<i>Motivational orientation</i>						
Extrinsic goal	-.39	-2.29	.027*			
Control of learning beliefs	.55	2.48	.043*			
<i>Learning strategies</i>						
Elaboration	.45	2.21	.029*	.73	2.94	.005**
Rehearsal	-.58	-2.77	.009**			
<i>Computer competence</i>						
Familiarity with word processing	.27	2.04	.045*			

* $p < .05$, ** $p < .01$.

Discussion

Perceptions of the e-learning environment

Our findings confirm the claim that students have clear preferences that go beyond the features of the actual learning environment (Fraser, 1994). In the innovative e-learning environment, students appreciated to a large extent the problem-based-learning (PBL) characteristic as compared to their conventional learning environment. This is probably especially related to the fact that students were actively involved in the online discussions and were continuously stimulated to apply the new knowledge when solving authentic problems. The finding supports the claim that new learning environments can encourage students to develop problem solving skills (Neo, 2003). However, the results in relation to the other key characteristics of the learning environment indicate that students have less favourable perceptions of the innovative ELE as compared to their perception of the CLE. Especially their perceptions about the level of interaction and help provision were less positive.

Our results are consistent with the findings of Johnson et al. (2000) that students in e-learning settings report less positive perceptions of student/instructor interaction compared to conventional settings. This suggests that the online environment may lack the same strong social dimension as face-to-face communication. Another possible explanation could be that student expectations with regard to student-instructor interaction are based on their experiences in conventional face-to-face settings. Even though the amount of interaction may have been adequate to support their actual learning, it may not have been equal to what they were used to.

The results can also be explained by the fact that these students experienced the e-learning environment for the first time. The findings of Gijbels et al. (2006) suggested that student perceptions are not only based on the actual learning environment, but are also strongly influenced by their prior learning experiences and recent experiences. Our results indicate that the students were not fully prepared for the requirements of the e-learning environment. The students were used to the more conventional learning modes and it is possible that their learning styles were not completely in line with the characteristics of the e-learning environment (Schellens & Valcke, 2000). Prior studies show that students reflect a more positive attitude towards the learning environment when there is greater congruence between the learning environment and student characteristics (Fraser & Fisher, 1983; Entwistle & Tait, 1990). Our results point out that the new e-learning environment did not fully meet the students' expectations. For example, during the interviews,

students reported that they expected more teacher/tutor involvement and guidance. Other studies (e.g. Beard et al., 2004) also reported that students expressed concerns about the lack of instructor interaction when they were involved for the first time in an e-learning course format.

Furthermore, although the quantitative data indicated less positive perceptions of the innovative e-learning environment by these Chinese students, our interview results revealed that more than one third of the students reported explicitly positive experiences with the e-learning environment. And almost half of the students found asynchronous group discussion an interesting and useful learning method. This indicates that when e-learning with asynchronous group discussion is used properly, and sufficient support is given, these Chinese students could also appreciate and benefit from the e-learning environment.

Factors affecting student performance in e-learning

Our results give support to the assumption that students' motivational orientations - such as extrinsic goal and control of learning beliefs - have a significant impact on student performance in online group discussion. Students reflecting a higher motivation level have attained better performance in online group discussions. This confirms previous claims that motivational characteristics are important in e-learning (Sewart, Keegan, & Holmberg, 1993). The elaboration strategy was found to be a positive predictor of the final test score. This is in line with findings of Curry (2006) that elaboration strategies were positively related to student final grade, as elaboration strategies "help the learner integrate and connect new information with prior knowledge" (Pintrich et al., 1991, p. 20).

The results indicate that student's general computer competence had no significant effect on student performance in the online discussions. The study of Brinkerhoff and Koroghlanian (2005) pointed out that student's computer skills develop over time. Our interview results also show that students very quickly got acquainted with the e-learning format and their prior computer competence did not hinder their learning activities.

The hypothesis that student perceptions of the e-learning environment have an impact on student online performance is not supported by our data. This is incongruent with previous studies (e.g. Lizzio et al, 2002). However, it has to be noted that in their study and most of the previous studies, perceptions of learning environments focused on predictors such as "good teaching" and "workload". It seems that student perceptions of learning environments are

triggered by a larger number of factors, such as personal and environmental characteristics. The results of this study show that motivational orientations and self-regulation are more important predictors of success than student preferences for specific learning environment characteristics. Further research is needed in order to understand the success factors and thus help the students to attain a higher performance in e-learning environments.

Chinese cultural and educational context

Is the e-learning mode focused on asynchronous group discussions suitable for Chinese students? Chen (2006) mentioned that there are four factors that influence Chinese education: authority, face, harmony, collectivism. This can be related in the following ways to the Chinese students' involvement in online group discussions.

First, there can be differences in the expectations as to teacher involvement. Teachers or tutors play a very important role in Chinese educational contexts. Students seem to expect the same teacher/ tutor presence in e-learning environments. Earlier studies underpin that Chinese students expect to a greater extent that teachers with expert knowledge are present in the learning environment as compared to Flemish students (Zhu et al. 2007). Observations of the current e-learning programs in China indicate that e-learning tends to be heavily instructor led, for example, by using video lectures online. Friesner & Hart (2004) commented that Chinese e-learners feel they are subservient to a teacher and this could prove problematic when teacher or tutor presence is very low. Our interview with students confirms that students experienced this as a problem.

Secondly, this can affect the level of student involvement in the online group discussions. Chinese students tend to be restrained in formal or open discussions. Open discussion in forums could be seen as an infringement of cultural values by Chinese students (Chan et al., 1999). Additionally, they might favour to a lesser extent online discussions due to the cultural influence of "talking of the known rather than talking to know" (Jin & Cortazzi, 1998). Our interview results revealed that although the students participated in the discussions as required, some students submitted comments in a limited way or hardly posted questions to other students. Often they only submitted a "safe" response or quoted from the literature instead of developing their own thoughts. The group members hardly criticized each other's input. This can be explained by a tendency to preserve 'harmonious' group communication.

Last but not least, Chinese students' lack of experience with this type of e-learning environments can be an important factor. Teacher-centered

approaches are still prevalent in Chinese universities. Online learning is available in some universities, but this reflects mostly the fact that course materials are distributed online. The use of task-based online collaboration – as implemented in this study – is scarce in Chinese higher education contexts. Therefore, student perceptions of the innovative e-learning environment were certainly influenced by their long traditional schooling experience.

Limitations and conclusions

This study has provided insights into student perceptions of asynchronous group discussions within a blended online course in a Chinese context. Of key importance is the finding that Chinese students' perceptions of the e-learning environment were less favorable as compared to their perceptions of their prior conventional learning environment. Another point is that the students had positive expectations about the collaborative e-learning environment, but after actually experiencing the e-learning set up, their perceptions were less positive. This could have to do with the fact that the students were not familiar with this learning approach. It might be also due to the relatively short duration of the implementation of the new learning environment. In future research, the e-learning course should therefore be implemented during a longer period of time and in a variety of settings. This could also be helpful to study an evolution in students' perceptions about the learning environments, as well as to study the effect of mediating variables on student performance. An additional direction for future research is to compare perceptions of the e-learning environment and online performance of students from different cultures. This might be helpful to understand the influence of cultural variables on student preferences of learning environment design variables and learning approaches, and to be able to generalize our findings to other higher education settings.

As to the design of collaborative activities in e-learning courses, further efforts are needed to improve the overall student/instructor interaction, especially in the area of instructor feedback, at least in the Chinese context. Motivation and learning strategies were confirmed to be important predictors for student online performance. The results also point at the persistent influence of earlier dominant experiences with instructional formats. We learn from this that a change in student perceptions necessitates a more extensive and a longer period of instructional reform. Lastly, student online performance and final test scores were used as dependent variables in this study. Future research could examine how a collaborative e-learning environment influences

student development of generic skills such as written communication, problem solving, analytic skills, and teamwork, which are among the main goals of instructional design (Bennett et al., 1998).

References

- Beard, L. A., Harper, C., & Riley, G. (2004). Online Versus On-Campus Instruction: Student Attitudes & Perceptions. *TechTrends: Linking Research & Practice to Improve Learning*, 48 (6), 29-31.
- Bennett, N., Dunne, E. & Carre, C. (1998). Patterns of core and generic skills provision in higher education. *Higher Education*, 37, 71-93.
- Blass, E. & Davis, A. (2003). Building on solid foundations: establishing criteria for e-learning development. *Journal of Further and Higher Education*, 27 (3), 227-245.
- Brinkerhoff, J. & Koroghlanian, C. M. (2005). Student Computer Skills and Attitudes toward Internet-delivered Instruction: An Assessment of Stability over Time and Place. *Journal of Educational Computing Research*, 32(1), 27-56.
- Brok, P. den, Brekelmans, M., & Wubbels, T. (2006). Multilevel issues in research using students' perceptions of learning environments: The case of the Questionnaire on Teacher Interaction. *Learning Environments Research*, 9(3), 199-213.
- Chan, M. S. C, Yum, J., Fan, R. Y. K., Jegede, O., & Taplin, M. (1999, October). *Locus of control and metacognition in open and distance learning: A comparative study of low and high achievers*. Paper presented at the 13th. Annual Conference, Asian Association of Open Universities. The Central Radio & TV University, Beijing, China.
- Chen, Z. (2006). *Cultural Influence on Learner's Behaviour in an On-line English Teacher Training Course*. Paper presented at the 2nd International Chinese Learners Conference, University of Portsmouth, 15-16 July, 2006.
- Cheung, L.L.W. & Kan, A.C.N. (2002). Evaluation of Factors Related to Student Performance in a Distance-Learning Business Communication Course. *Journal of Education for Business*, May/June, 257-263.
- Chin, K. L., Chang, V., & Bauer, C. (2000). The use of web-based learning in culturally diverse learning environments. In *Proceedings of AusWeb2K. Sixth Australian World Wide Web Conference*. Rihga Colonial Club Resort, Cairns, 12-17 June 2000.
<http://ausweb.scu.edu.au/aw2k/papers/chin/paper.html>
- Curry, K.J. (2006). Motivation and learning strategies of students in distance education. *Journal of the Mississippi Academy of Sciences*, April 1, 2006.

- De Wever, B., Schellens T., Valcke, M., & Van Keer H. (2006). Content analysis schemes to analyze transcripts of online asynchronous discussion groups: A review. *Computers & Education*, 46, 6-28.
- Dutton, J., Dutton, M., & Perry, J. (2002). How do online students differ from lecture students? *Journal of Asynchronous Learning Networks*, 6(1), 1-20.
- Entwistle, N. & Tait, H. (1990). Approaches to learning, evaluations of teaching, and preferences for contrasting academic environments, *Higher Education*, 19, 169–194.
- Ergul, H. (2004). Relationship Between Student Characteristics and Academic Achievement in Distance Education and Application on Students of Anadolu University. *Turkish Online Journal of Distance Education-TOJDE*, 5, No.2.
- Fraser, B.J. (1994). Classroom and school climate. In D. Gable (Ed.), *Handbook of research on science teaching and learning*. National Science Teachers Associations, Australia: Macmillan.
- Fraser, B.J. & Fisher, D.L. (1983). Use of actual and preferred CES in person-environment fit research, *Journal of Educational Psychology*, 75, 303-311.
- Friesner, T. & Hart, M. (2004). "A cultural analysis of e-learning for China". *Electronic Journal of eLearning*, 2(1), 81-88.
- Gijbels, D., Van De Watering, G., Dochy, F., & Van Den Bossche, P. (2006). New learning environments and constructivism: The students' Perspective. *Instructional Science*, 34, 213–226.
- Ginns, P., Ellis, R. (2007). Quality in blended learning: Exploring the relationships between on-line and face-to-face teaching and learning. *The Internet and Higher Education*, 10 (1), 53-64.
- Jin, L. & Cortazzi, M. (1998). Dimensions of dialogue: Large classes in China. *International Journal of Educational Research*, 29, 739-761.
- Johnson, S. D., Aragon, S. R., Shaik, N., & Palma-Rivas, N. (2000). Comparative analysis of learner satisfaction and learning outcomes in online and face-to-face learning environments. *Journal of Interactive Learning Research*, 11(1), 29-49.
- Lim, C.K. (2001). Computer self-efficacy, academic self-concept, and other predictors of satisfaction and future participation of adult distance learners. *The American Journal of Distance Education*, 15(2), 41-51.
- Lizzio, A., Wilson, K., & Simons, R. (2002). University Students' Perceptions of the Learning Environment and Academic Outcomes: implications for theory and practice. *Studies in Higher Education*, 27 (1), 27 – 52.

- Marton, F. & Booth, S. (1997). *Learning and awareness*. Hillsdale, New Jersey: Lawrence Erlbaum Associates.
- McLoughlin, C. & Luca, J. (2002). A learner-centred approach to developing team skills through web-based learning and assessment. *British Journal of Educational Technology* 33 (5), 571–582.
- Meyer, J. & Muller, M. (1990). Evaluating the quality of student learning. I- an unfolding analysis of the association between perceptions of learning context and approaches to studying at an individual level. *Studies in Higher Education*, 15, 131-54.
- Minasian-Batmanian, L.C. (2002). Guidelines for developing an online strategy for your subject. *Medical Teacher*, 24 (6), 645-657.
- Neo, K. (2003). Using multimedia in a constructivist learning environment in the Malaysian classroom. *Australian Journal of Educational Technology*, 19(3), 293-310.
- Piotrowski, C. & Vadonovich, S. J. (2000). Are the reported barriers to Internet-based instruction warranted?: A synthesis of recent research. *Education*, 121(1), 48-53.
- Pintrich, P.R. & Schrauben, B. (1992). Students' motivational beliefs and their cognitive engagement in classroom academic tasks. In D.H. Schunk & J.Meece (Eds.), *Student Perceptions in the Classroom*, 149-179. Hillsdale, NJ: Lawrence Erlbaum.
- Pintrich, P., Smith, D., Garcia, T., & McKeachie, W.J. (1991). *A manual of the use of the motivated strategies for learning questionnaire (MSLQ)*. Ann Arbor: The University of Michigan.
- Prosser, M. & Trigwell, K. (1999). *Understanding Learning and Teaching*. Buckingham, Society for Research into Higher Education and Open University Press.
- Ramsden, P. & Entwistle, N.J. (1981). Effects of academic departments on students' approaches to studying, *British Journal of Educational Psychology*, 51, 368–383.
- Ramsden, P. (1991). A performance indicator of teaching quality in higher education: the Course Experience Questionnaire, *Studies in Higher Education*, 16, 129–150.
- Schellens, T. & Valcke, M. (2000). Re-engineering conventional university education: Implications for students' learning styles. *Distance Education*, 21(2), 361-384.
- Sewart, D., Keegan, D., & Holmberg, B. (1993). *Distance Education: International Perspectives*. Billings & Sons. Limt.

- So, H.J. & Brush, T.A. (2008). Student perceptions of collaborative learning, social presence and satisfaction in a blended learning environment: Relationships and critical factors. *Computers & Education*, 51 (1), 318-336.
- Teh, G.P.L. & Fraser, B. J. (1994). Development and validation of an instrument for assessing the psychosocial environment of computer-assisted learning classrooms. *Journal of Educational Computing Research*, 12(2), 177-193.
- Thompson, L. & Ku, H.Y. (2005). Chinese graduate students' experiences and attitudes toward online learning. *Educational Media International*, 42 (1), 33-47.
- Wang, H. (2006). How cultural values shape Chinese students' online learning experience in American universities. Ph.D dissertation, the University of Georgia.
- Zhu, C., Valcke, M. & Schellens, T. (2008). A cross-cultural study of Chinese and Flemish university students: Do they differ in learning conceptions and approaches to learning? *Learning and Individual Differences*, 18, 120-127.
- Zimmerman, B. J. (2002). 'Becoming a Self-regulated Learner: An Overview', *Theory Into Practice*, 41(2), 64-72.

Appendix A.

Questionnaire on the experience in the conventional classroom learning environment

Actual: To what extent is this statement true for your current learning and teaching environment?

0= absolutely not true (or never happen); 6= very true (or happens very often).

Preferred: To what extent do you want this characteristic to be implemented in your learning and teaching environment? 0= I absolutely don't want it or dislike it; 6= I very much want it or like it.

Scale	Sample item
Discussion	My classmates and I actively participated in group discussions in the class.
Critical thinking	My classmates and I felt comfortable to express different ideas in the class.
Peer learning	In my class, my classmates and I often try to work on assignments together.
Problem-based learning	In my class, the teachers often ask us to apply our knowledge to solve real life problems.
Interaction	I actively expressed my ideas and interacted with my classmates in the class.
Help	The teacher helped us when my classmates and I had questions about the course.

Appendix B.

Questionnaire on the experience and appreciation of the e-learning environment

Actual: To what extent is this statement true for your experience in the implemented e-learning environment? (0-6)

Preferred: To what extent do you want this characteristic to be implemented in your future e-learning environment? (0-6)

Scale	Sample item
Discussion	My group mates and I actively participated in the online group discussions.
Critical thinking	My group mates and I felt comfortable to express different ideas in the online discussions.
Peer learning	I collaborated with other group mates online when working on the assigned tasks.
Problem-based learning	Real problems or cases were provided in the online discussion forum for us to study.
Interaction	I actively expressed my ideas and interacted with my group members in the group discussions.
Help	The tutor gave us help via email or in the online discussion groups.

Chapter 5

A cross-cultural study of online collaborative learning *

Abstract

A parallel e-learning environment for a first-year university course was implemented for a Flemish group ($n=217$) at Ghent University and a Chinese group ($n=165$) at Beijing Normal University. Student perceptions of the online collaborative learning environment and their motivation and learning strategies before and after the e-learning experience were measured. The findings show that the Flemish group perceived the online collaborative learning environment more positively compared to the Chinese group. However, Chinese students' motivation and learning strategies evolved towards a way that is more in line with a social-constructivist learning approach after the online collaborative learning experience. The current results indicate that students from different cultural contexts perceive online collaborative learning environment differently. Specific cultural adaptations in e-learning design could be considered when an e-learning environment is to be implemented cross-culturally.

Introduction

Constructivism is a major conceptual framework guiding and shaping new instructional approaches (Wilson, 1996). Wilson (1996, p. 5) defines a constructivist learning environment as “a place where learners may work together and support each other as they use a variety of tools and information resources in their guided pursuit of learning goals and problem-solving activities”. Brandon (2004) stresses that a constructivist learning environment should provide a supportive and motivating environment in which learners can solve problems, interact with others, and assess their learning. Social constructivism emphasizes the social and cultural context of cognition (Duffy

* Based on Zhu, C., Valcke, M. & Schellens, T. (2009). Cultural differences in the perception of a social constructivist e-learning environment. *British Journal of Educational Technology*. 40 (1), 164-168.

& partly based on Zhu, C., Valcke, M. & Schellens, T. (in press). A cross-cultural study of online collaborative learning. *Multicultural Education and Technology Journal*.

& Cunningham, 1996). Social interaction is crucial in the learning process. This explains the value attached to collaboration as a base for individual and group learning. This specific approach to learning and instruction has especially influenced the design of ICT-based learning environments (Jonassen, 1991).

How students engage in learning is also influenced by personal experiences within particular cultural contexts (Zhu, Valcke & Schellens, 2008). Student reactions to the social constructivist learning environments differ depending on learners' prior experiences, but also on the distinct communication norms across cultures (Chang & Lim, 2002). In addition, student perceptions of the learning environment and their motivation dynamics are important factors to evaluate the nature and quality of educational interventions. This study examines whether there is a cultural gap in student perceptions of online collaborative learning, and the evolution over time of student perceptions, motivation and learning strategies due to the actual involvement in a collaborative e-learning environment.

Theoretical and empirical background

Social-constructivist learning environment and cultural contexts

A social-constructivist e-learning environment should address the critical features of social-constructivist pedagogy, that is, technologies should be used to keep students 'active, constructive, collaborative, intentional, complex, contextual, conversational, and reflective' (Jonassen, 2001). Regardless of the particular features recommended for constructivist e-learning environments, what is emphasized over and over again is the importance of the inclusion of collaborative opportunities that allow social interaction.

Intercultural factors can have a significant effect on how learners engage with their learning. Hannon and D'Netto (2005) argue that in an online learning setting, these effects become embedded and may be intensified. E-learning could be 'culturally inclusive' as Doherty (2004) assumes, but it does not eliminate cultural gaps, for instance in student preferences and perceptions of learning environments. Researchers have observed that there are 'cultural gaps' between individuals in online learning (Chase et al., 2002). For instance, it is observed that participation rates differ between different cultural groups in online communication (Macfadyen, 2005). It is important to consider the cultural backgrounds of learners when discussing the impact of social-constructivist e-learning because culture shapes learners' values, perceptions

and goals, and determines how they respond to social-constructivist e-learning. However, little has been studied empirically as to learners' perceptions of a social-constructivist e-learning environment and its differential impact in different cultural contexts (Gribble & Ziguras, 2003).

Students' reaction to social-constructivist learning can be different since the learners involved have significant communication norms that are distinctly different across cultures (Chang & Lim, 2002). The influence wielded by the cultural values of learners can impact upon the learning process (Chang, Wang & Lim, 2002). The research of Wang (2006) shows that, influenced by Chinese values, Chinese students perform differently compared to their American classmates in an online environment. For example, they are more silent, passive, diligent, formal and content-oriented in discussions; deferent to teacher; have concern for others; and worry about losing face. Asian and Western cultures generate different educational philosophies and beliefs. Chin, Chang and Bauer (2000) report that a Western student group seems more confident in using web-based learning than Asian students. Their results indicate that Western students are more accustomed to student-centred learning environments whereas Asian students prefer a teacher-centred approach. The study of Thompson and Ku (2005) points out that Chinese e-learning participants indicated that online learning was an interesting experience for them; however, they had mixed attitudes toward this unfamiliar mode of learning. Li and Kirkup (2005) found out that although Chinese students are self-confident about their computer skills, they are less likely to use computers for study purposes than British students. Tiong and Yong (2004) also notice that Confucian-Heritage Culture students are low participants when it comes to group discussion among peers and teachers.

Student motivation and learning strategies

Many factors influence students' learning. Among them, students' motivational orientations and learning strategies play an important role. In the learning environment, students must be motivated to use learning strategies to regulate their cognition and effort (Pintrich, 1989). Weinstein and Mayer (1986) defined three general types of learning strategies. Cognitive strategies such as rehearsal, elaboration, and critical thinking help the learner to analyse, synthesise, understand and remember information. Students' metacognitive strategies are important for planning, monitoring, and modifying their cognition (Zimmerman & Pons, 1988). A third important aspect is that

students must learn to manage the support of others and collaborate with peers. Our measurements of learning strategies included these three aspects.

Previous studies have shown that the greater the degree of student involvement, the greater the student learning and affective development (Pascarella & Terenzini, 1991). Ames (1992) suggests that the learning environment itself is critical to foster motivation and cognitive engagement. She asserts that learning environments that emphasise active participation and responsibility on the part of the learner are likely to foster a motivational orientation toward deep-level cognitive processing, persistence and effort. Pintrich, Smith, Garcia and McKeachie (1993) also argue that contextual factors are likely to have a significant effect on students' motivational beliefs.

Previous results show that students exhibit greater motivation when course content interests them and when they experience the personal relevance of the learning content (Adler, Milne & Stablein, 2001). Furthermore, as students become more experienced in online learning, their attitudes toward e-learning and blended approaches may change (Benbunan-Fich & Hiltz, 2003). Following this line of research, we assume that a social-constructivist learning environment could foster students' motivation and learning strategies, such as critical thinking and peer learning, which are more in line with a social-constructivist learning approach. Therefore, in this study, we examine how student motivation and learning strategies develop in an online collaborative learning environment.

Perceptions of (e)learning environments

The study of Niles (1995) points out a need to better understand student perceptions of e-learning adopting a constructivist approach. Student perceptions of learning environment are an important factor to evaluate the nature and quality of educational interventions (Lizzio, Wilson & Simons, 2002).

Online asynchronous discussion is a central component of the social-constructivist e-learning environment implemented in our study. Discussion is considered to support the accessibility, interaction, and educational flexibility of student learning (Bernard & Lundgren-Cayrol, 2001). Asynchronous discussions provide students with extra time to reflect and encourage more thoughtful and reflective discussion (De Wever et al., 2007).

Problem-based learning (PBL) implies that authentic problems are presented during the learning process. Through this process, students are expected to apply the required knowledge and problem-solving skills. In the implemented e-learning environment, authentic problems were given to

students to develop solutions and/or to reach a consensus within a group discussion. PBL is a central feature of many e-learning environments that is highly consistent with constructivist characteristics (Hendry, Frommer, & Walker, 1999). Online instruction, including asynchronous group discussions, can facilitate learning by providing real-life context to engage learners in solving complex problems (Honebein, 1996).

The social constructivist learning theory suggests that learning is promoted or enhanced when students are actively involved in the learning and when critical thinking is promoted through applied and reflective activities (Driscoll, 2002). Neo (2003) put forth that via collaborative problem-based learning, students are able to develop skills such as teamwork, collaboration and cooperation. Students also develop critical thinking through the analysis, synthesis, evaluation and reflection while solving authentic problems. Based on this kind of interactive and cooperative forms of learning, individual interpretations and understandings meet each other, which encourage students to develop team skills, such as peer interaction and help (McLoughlin & Luca, 2002).

Based on the elements mentioned above, we focus on two research questions in this study. Is there a cultural gap in student perceptions of online collaborative learning? Is there a cultural gap regarding the evolution of student perceptions, motivation and learning strategies over time due to the actual involvement in a collaborative e-learning environment? We examine students' perceptions of online collaborative learning in terms of their perceptions about group discussion, critical thinking, problem solving, peer learning, interaction and help in the actual learning environment, and their preferences with regard to an "ideal" learning environment.

Method

Participants

A parallel e-learning environment for a first-year university course in "Instructional Sciences" was implemented at Ghent University and Beijing Normal University. The same content (handbook) and teaching approach (lecture sessions followed by online group assignments) is applied in the two settings. Participants were 165 Chinese and 217 Flemish freshmen in educational sciences. Choosing students from the same study domain reduces the influences of third-constructs. The mean age of the two groups was similar (mean=18.74 for Chinese and mean=19.15 for Flemish students). Among the

Chinese group, 68% students are female and 32% male. Among the Flemish group, 84% students are female and 16% are male.

Procedure

Next to face-to-face lecture sessions, all students participated in the online asynchronous discussions. Each student was randomly assigned to a group of seven to ten students. The authentic discussion tasks implied the application of the knowledge base about three Instructional Sciences themes: behaviourism, cognitivism, and constructivism. In view of each theme, two to three discussion tasks were presented to the students. Students were required to participate in the asynchronous group discussions at least twice a week. Each online discussion group was monitored by a tutor who gave support and guidance to his or her group. Tutors were not supposed to participate at content level, but only to encourage, supervise, moderate, and give directions to the discussion groups. Tutors were trained beforehand, and a guideline was provided to the tutors. One of the authors participated in the training for the Chinese tutors to ensure the consistency in the two contexts.

Instruments

Student perceptions of the learning environment were measured including subscales that centred on critical features of the learning environment: group discussion, critical thinking, problem-based learning, peer learning, interaction and help seeking/provision. This questionnaire has been validated in previous studies (Zhu et al., in press). Students were required to report on a Likert scale (from 0-6) the extent they disagree/agree or dislike/like about the presence of a certain feature in their learning environment. Pre-tests were administered to measure student perceptions and preferences at the beginning of the first semester, and post-tests were administered at the end of the first semester. The number of items and reliabilities of the subscales were reported in Table 1. Part of the Motivated Strategies of Learning Questionnaire (MSLQ) (Pintrich et al., 1993) was used to assess student motivation orientations and the adoption of learning strategies before and after the collaborative e-learning experience. Research instruments reflected acceptable reliability levels ($\alpha > .70$) (Table 2). Student prior computer competence and use of the e-learning environment was measured in the pre-test and post-test accordingly.

Table 1. Number of items and reliabilities of the subscales of perceptions of the learning environments (CLE and ELE)

Subscale	No. of items	CLE		No. of items	ELE	
		Cronbach α Flemish	Chinese		Cronbach α Flemish	Chinese
Discussion	5	.77	.72	6	.86	.67
Critical thinking	4	.69	.65	5	.75	.71
Peer learning	4	.68	.70	5	.69	.72
Problem-based-learning	3	.67	.68	5	.71	.69
Interaction	4	.84	.77	5	.73	.76
Help	3	.79	.69	4	.72	.74

Table 2. Internal reliability of the MSLQ subscales for the Chinese and Flemish sample

Subscale	Cronbach α	
	Chinese ($n=165$)	Flemish ($n=217$)
<i>Motivation</i>		
Intrinsic Goal Orientation	.78	.79
Extrinsic Goal Orientation	.70	.71
Control of Learning Beliefs	.71	.75
Self-efficacy for learning and performance	.93	.90
<i>Learning Strategy</i>		
Rehearsal	.71	.77
Elaboration	.78	.74
Critical Thinking	.80	.82
Metacognitive Self-Regulation	.79	.80
Peer Learning	.77	.76

The quantitative data were analyzed with SPSS 15 using paired *t*-tests and multivariate analysis. Focus-group interviews were conducted with a random choice of 60 Chinese students to inquire about their perceptions of online collaborative learning. Interview data were used only to enrich the discussion of results in this study.

Results

Student prior computer competence and participation in online group discussions

The Flemish and Chinese students differed significantly in their prior computer competence and actual use of the e-learning environment. Compared to the Chinese students, the Flemish students had easier access to computer and Internet, and they were more familiar with the use of computer such as word processing ($p<.001$). The Flemish students on average spent more time online and used more frequently emails than the Chinese students. Most Flemish students had computer access at home, but most Chinese students had only computer access at university PC rooms. As a result, the Flemish students were more familiar with the use of the e-learning environment than the Chinese students ($p<.001$). The Flemish group on average posted more messages in the asynchronous group discussions than the Chinese group ($p<.01$).

Perceptions of the e-learning environment: Flemish and Chinese students

From the start, Chinese students reflected more positive perceptions towards peer learning, interaction and help giving/getting compared to the Flemish students, while the Flemish students were more positive towards critical thinking and problem-based learning. Chinese students expressed a higher preference for discussions, peer learning, interaction and help as compared to Flemish students. But after the online collaborative learning experience, the Flemish group adopted a more positive attitude towards the social constructivist e-learning environment as compared to their initial perceptions. In contrast, the Chinese group had a decrease in their perceptions compared to their initial perceptions. The mean scores and the mean differences of student perceptions of the learning environment are presented in Table 3.

Table 3. Mean scores of perceptions of learning environment of Flemish and Chinese students in pre and post tests

Variable	Mean (Pre-test)				Mean (Post-test)			
					Pre and post mean difference			
	Flemish		Chinese		Flemish		Chinese	
	Actual	Preferred	Actual	Preferred	Actual	Preferred	Actual	Preferred
Discussion	4.36	4.39	4.30	4.95	4.84	4.92	3.58	4.55
					.48***	.53***	-.72***	-.40***
Critical thinking	4.38	4.85	4.12	4.75	4.69	5.15	3.11	4.47
					.31***	.30***	-1.01***	-.28*
Problem-based learning	4.59	5.03	4.19	4.97	4.82	5.32	3.61	4.43
					.23**	.29***	-.58***	-.54***
Peer learning	3.61	4.43	4.07	4.72	5.14	5.39	2.98	4.50
					1.57***	.96***	-1.09***	-.22*
Interaction	4.06	4.69	4.49	5.17	4.30	4.96	2.68	4.59
					.24**	.27***	-1.81***	-.58***
Help	4.24	4.94	4.61	5.14	4.03	4.65	2.79	4.47
					-.21**	-.29***	-1.82***	-.67***

* $p < .005$, ** $p < .01$, *** $p < .001$.

The results indicate that the Flemish group was more positive towards the e-learning environment than the Chinese group. Furthermore, a multivariate analysis was conducted taking cultural group as the fixed factor, the pre-perceptions as covariates, and the post-perceptions as dependent variables. The results show that the cultural group effect was significant in relation to all the perception dimensions ($p<.05$) (Table 4).

Table 4. Multivariate test results regarding cultural group effects on perceptions of learning environments

Variable	Multivariate tests: cultural group effects			
	Actual		Preferred	
	<i>F</i>	<i>Partial Eta Squared</i>	<i>F</i>	<i>Partial Eta Squared</i>
Discussion	84.10***	.28	18.29***	.08
Critical thinking	61.82***	.22	47.72***	.19
Problem-based learning	115.96***	.32	46.89***	.17
Peer learning	231.62***	.53	53.41**	.20
Interaction	114.55***	.34	8.65**	.05
Help	68.13***	.23	6.65*	.03

* $p<.005$, ** $p<.01$, *** $p<.001$.

Evolution of motivation and learning strategies of Flemish and Chinese students

At the pre-test level, Flemish and Chinese students did not differ in their intrinsic and extrinsic motivational orientations. But Chinese students reported a higher level of control of learning beliefs ($t=2.69$, $p<.01$) and self-efficacy ($t=4.12$, $p<.001$), while the Flemish students reported a higher adoption of learning strategies, such as elaboration ($t=4.31$, $p<.001$), rehearsal ($t=2.71$, $p<.01$), self-regulation ($t=2.49$, $p<.05$), and peer learning ($t=2.19$, $p<.05$). After the online collaborative learning experience, no significant changes were detected in Flemish students regarding their motivation and learning strategies,

except a significant decrease in the learning strategy dimension ‘peer learning’ ($t=2.81$, $p<.01$). However, the Chinese group reported a higher adoption of the different learning strategies and higher motivation levels. The means and mean differences of the motivation and learning strategies of Flemish and Chinese students in the pre- and post- tests are presented in Table 5. Multivariate analyses show that culture had a significant impact on the adoption of learning beliefs, critical thinking and peer learning ($p<.05$) (Table 6).

Table 5. Mean and Mean difference of motivation and learning strategies of Flemish and Chinese students in pre- and post- tests

<i>Variable</i>	<i>Flemish</i>			<i>Chinese</i>		
	<i>Pre-test</i>	<i>Post-test</i>	<i>Mean difference</i>	<i>Pre-test</i>	<i>Post-test</i>	<i>Mean difference</i>
Intrinsic motivation	4.99	5.01	.02	5.04	5.42	.38**
Extrinsic motivation	4.87	4.96	.09	4.83	5.30	.47***
Control of Learning Beliefs	4.69	4.64	-.05	4.97	5.48	.51***
Self-efficacy for learning and performance	4.28	4.12	-.16	4.71	5.20	.49***
Critical Thinking	4.48	4.47	-.01	4.39	5.14	.75***
Elaboration	5.19	5.22	.03	4.72	5.36	.64***
Rehearsal	4.77	4.75	-.02	4.48	5.06	.58***
Metacognitive Self-Regulation	4.82	4.85	.03	4.61	5.01	.40***
Peer Learning	4.02	3.80	-.22**	3.76	4.36	.60***

** $p<.01$, *** $p<.001$.

Table 6. Multivariate test results regarding cultural group effects on motivation and learning strategies

Variable	Multivariate tests: cultural group effect		
	F	Sig.	Partial Eta Squared
Intrinsic motivation	.20	.65	
Extrinsic motivation	.09	.77	
Control of Learning Beliefs	5.72	.018*	.034
Self-efficacy	2.84	.094	
Critical Thinking	6.45	.012*	.04
Elaboration	.76	.38	
Rehearsal	.98	.32	
Metacognitive Self-Regulation	.47	.49	
Peer Learning	4.58	.034*	.023

* $p < .05$

Discussion and conclusion

Perceptions of a collaborative e-learning environment: a cultural gap?

The results of the present study indicate that the Flemish students did perceive the collaborative e-learning environment more positively as compared to their conventional learning environment. This seems to be true for all dimensions: discussion, critical thinking, problem-based learning, peer learning and interaction. The results support the theoretical assumption that a social constructivist learning environment promotes collaborative and constructive learning, interaction among peers, and problem-solving activities (Van Meter & Steven, 2000). The Flemish students reported a less positive perception in relation to the “help”-dimension as compared to their experiences in the conventional learning environment. This is probably because students feel that they could not get direct and immediate help from teachers and fellow students as they were used to in a face-to-face environment.

In contrast, the Chinese students did not perceive the collaborative e-learning environment more positively when compared to their conventional learning environment. This could partly be due to the fact that Chinese students reported a lower level of computer competence and internet use. Besides that, as we presented earlier, teaching approaches at Chinese universities and high schools are traditionally behaviourist oriented. The Chinese students were not used to the social-constructivist learning approach. Although a participatory approach has started to be promoted in recent years, the emphasis on examination scores and the highly competitive university entrance examination still plays an important role.

Evolution in student motivation and learning strategies in a constructivist e-learning environment

As for the Chinese students, although their perceptions of the e-learning environment are significantly lower than those of Flemish students, they are both intrinsically and extrinsically more motivated, and their learning strategies shift in a way that is in line with the social-constructivist learning approach (Kirschner, 2001). For instance, they reported to a higher level the adoption of learning strategies such as critical thinking, elaboration, self-regulation and peer learning. This could be partly due to the fact it was a very innovative design of a learning environment for Chinese students. The new learning approach differs strongly from their conventional way of learning. The results show how the experience of learning in an innovative learning environment affects the motivation and the adoption of learning strategies of students. The findings give support to the argument of Brandon (2004) that a constructivist learning environment is motivating and can foster student cognitive strategies. The study of Keller and Suzuki (2004) also confirmed that innovative e-learning design enhanced learners' motivation.

The results show that the Flemish students do not change significantly with regard to all dimensions of their motivation and learning strategies in the pre- and post- test. This could be due to the fact that for the Flemish students, the e-learning platform is already more widely implemented in their curriculum, and they are better prepared for this learning environment. Therefore, at least during the period of the research, the learning environment does not evoke significant changes of students' motivation and learning strategies.

Learning in different cultural contexts

The current study seems to indicate that on the one hand, Chinese students' perceptions of the constructivist e-learning environment are different from the perceptions of Flemish students. On the other hand, Chinese students are highly motivated to adopt a constructivist learning approach. This should be discussed under the different educational and cultural contexts.

As Joo (1999) states, although the Internet breaks down technological barriers in the international exchange of information and communication, it does not eliminate cultural obstacles. Ignoring cultural factors may lead to frustrating and ultimately ineffective learning experiences (Dunn & Marinetti, 2002).

First of all, a teacher-centred lecture method has been dominant in Chinese teaching and learning culture for centuries (Gu, 2006). The teacher is often seen as the expert who directs students in what they should learn and what is needed to pass the end of course examination. In Western classrooms, students raise questions in order to obtain knowledge or to understand, whereas in East Asian classrooms students tend to learn about the topic from memorisation and reflection and ask questions afterwards based on their processing of the new knowledge. The Chinese students might favour to a lesser extent online discussions because they were used to "talking of the known rather than talking to know" (Jin & Cortazzi, 1998), and they were concerned about the *correctness* of their contributions in formal discussions. Secondly, historically, Western and East Asian education systems prepare students differently (Cheng & Wong, 1996). The traditional Western understanding of teaching is that it should promote a facilitative, informal relationship between the learners and their teachers. Students from East Asian cultures, though, consider that a more formal relationship is needed to show proper respect (Fengjiao, Petrosko & Boyle, 2001). Watkins (2000) uses the analogy of the Chinese teacher–student relationship as one of parent and child. He reports that British students characterise a good teacher as one who could explain, use instructional methods and arouse interest, while Chinese students see a teacher as one with deep knowledge and able to provide 'correct' answers.

Thirdly, using new technologies such as e-learning platforms and group discussions can bring a large element of interest and motivation to their learning; however, online collaborative learning methods seem to face problems in the Chinese context, to name a few: 1) competition is rather endemic in the Chinese educational system, which works against the cooperative learning ethic; 2) most students expect a teacher to lead the

discussion or to post questions; 3) Chinese students are not well equipped for exploratory learning methods; they expect to be taught (McConnell & Zhao, 2006); 4) campus student-home setting (four to six students share a dormitory) seems to be also a relevant factor, as some students said they could easily discuss face-to-face.

It has been argued that Chinese students need activities that are culturally tailored to avoid putting them on the spot as individuals where they may not be able to present themselves as knowledgeable (Dunn & Wallace, 2004). Our findings suggest that an adaptation to provide more structure and guidance to students in asynchronous online group discussion could be welcomed by the Chinese students. Previous research put forth that structure in asynchronous discussions is valuable to trigger meaningful discourse (Gilbert & Dabbagh, 2005). Providing structure is seen as a form of scaffolding for students to get started in authentic activities, for example, introducing roles and peer tutoring in online tasks (De Wever *et al.*, 2007). The effect of assigned roles and using scripts to specify sequence and assign collaborative learning activities could be studied in our future comparative studies.

Limitation and implications

The study provides useful practical implications not only about the effectiveness of a particular social constructivist e-learning environment, but also the potential differential impact on students in different cultural settings. In order to implement a new teaching and learning approach in another cultural setting, student prior experiences and culture-related variables should be considered. The incurred changes in students, especially the adaptation of learning strategies of Chinese students could influence their subsequent studies. Future instructional design can take into account the changes of student attitudes resulting from this study and be more responsive to student needs, so that the learners can better benefit from the potential of a social constructivist instructional design. In addition, instructional designers can and should combine and choose among the different ideas within constructivism in meeting student expectations and teaching objectives (Stone & Goodyear, 1995).

The participants in both cultural contexts were similar in age, gender distributions and majoring subject, however, the students from both settings had different prior educational experiences and some specific institutional settings are different. In future studies, other variables such as student prior knowledge and the influence of specific settings on student perceptions and

motivations can be examined. This also implies that the current findings can only be generalized in a cautious way. Future studies could involve students from other study domains and other universities in order to further underpin to impacts of culture on student learning.

References

- Adler, R.W., Milne, M.J. & Stablein, R. (2001). Situated Motivation: An Empirical Test in an Accounting Course, *Canadian Journal of Administrative Sciences*, 18(2), 101-115.
- Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology*, 84, 261-271.
- Benbunan-Fich, R. & Hiltz, S.R. (2003). Mediators of effectiveness of Online Courses. *IEEE Transactions on Professional Communication*, 46 (4), 298-312.
- Bernard, R. M. & Lundgren-Cayrol, K. (2001). Computer conferencing: An environment for collaborative project-based learning in distance education. *Research and Evaluation in Education*, 7(2-3), 241-261.
- Brandon, B. (2004). Applying instructional systems processes to constructivist learning environments. *The e-Learning Developers' Journal*. Retrieved March 1, 2008, from <http://www.elearningguild.com/pdf/2/062904DES.pdf>
- Chang, T-T. & Lim, J. (2002). Cross-Cultural Communication and Social Presence in Asynchronous Learning Processes. *e-Service Journal*, 1 (3), 83-105.
- Chang, T., Wang, X. & Lim, J. (2002). Cross-Cultural Communication, Media and Learning Processes in Asynchronous Learning Networks. *Proceedings of the 35th Hawaii International Conference on System Sciences*, Volume 1, Washington, DC, USA: IEEE Computer Society.
- Chase, M., Macfadyen, L., Reeder, K. & Roche, J. (2002). Intercultural challenges in networked learning: Hard technologies meet soft skills. *First Monday*, 7 (8), Retrieved May 20, 2007 from http://firstmonday.org/issues/issue7_8/chase/index.html
- Cheng, K. & Wong, K. (1996). School effectiveness in East Asia: concepts, origins and implications, *Journal of Educational Administration*, 34(5), 39-49.
- Chin, K. L., Chang, V. & Bauer, C. (2000). The use of Web-based learning in culturally diverse learning environments, *Proceedings of AusWeb2K, the Sixth Australian World Wide Web Conference*, Rihga Colonial Club Resort,

- Cairns, 12-17, June, Lismore: Norsearch Ltd. Retrieved June 3, 2008 from <http://ausweb.scu.edu.au/aw2k/papers/chin/paper.html>
- Collins, A. (1991). "The role of computer technology in restructuring schools." *Phi Delta Kappan*, 73, 28-36.
- De Wever, B., Van Keer, H., Schellens, T., & Valcke, M. (2007). Applying multilevel modelling on content analysis data: Methodological issues in the study of the impact of role assignment in asynchronous discussion groups. *Learning and Instruction*, 17, 436-447.
- Doherty, C. (2004). Managing potentials: Cultural differences in a site of global/local education. Presented at Australian Association for Research in Education *Annual Conference*, 28 November – 2 December 2004, University of Melbourne. Retrieved June 24, 2008 from <http://www.aare.edu.au/04pap/doh04077.pdf>
- Driscoll, M. (2002). *Web-based training: Creating e-learning experiences*. (2nd ed.). San Francisco, CA: Jossey-Bass/Pfeiffer
- Duffy, T. M., & Cunningham, D. J. (1996). Constructivism: Implications for the design and delivery of instruction. In D. H. Jonassen (Ed.), *Educational communications and technology* (pp. 170-199). New York: Simon & Schuster Macmillan.
- Dunn, P. & Marinetti, A., (2002). *Cultural adaptation: Necessity for eLearning*. Retrieved Oct. 8, 2006 from <http://www.linezine.com/7.2/articles/pdamca.htm>.
- Dunn, L. & Wallace, M. (2004). Australian academics teaching in Singapore: striving for cultural empathy. *Innovations in Education and Teaching International*, 41 (3), 291 – 304.
- Fengjiao, J. B., Petrosko, J. & Boyle, M. (2001). Appropriate and inappropriate instructional behaviours for international training, *Human Resource Development Quarterly*, 12(3), 267–283.
- Gilbert, P. & Dabbagh, N. (2005). How to structure online discussions for meaningful discourse: A case study. *British Journal of Educational Technology*, 36-1, 5-18.
- Gribble, K. & Ziguras, C (2003). Learning to teach offshore: pre-departure training for lecturers in transnational programs. *Higher Education Research and Development*, 22 (2), 205-216.
- Gu, Y. (2006). An ecological model of e-learning in Chinese context-critical reflections of 5 years' practice of e-learning management in IBOE. *Studies in Continuing Education*, 28(2), 99–120.

- Hannon, J. & D'Netto, B. (2005). Cultural perspective in online learning. *Paper presented at the 2005 Conference of the Open and Distance Learning Association of Australia (ODLAA)*, Adelaide, South Australia.
- Hendry, G.D., Frommer, M., & Walker, R.A. (1999). Constructivism and problem-based learning. *Journal of Further and Higher Education*, 23(3), 359–371.
- Hew, K. F. & Cheung, W. S. (2003). An exploratory study on the use of asynchronous online discussion in hypermedia design. *Journal of Instructional Science & Technology*, 6(1). Retrieved April 5, 2008 from http://www.usq.edu.au/electpub/e-jist/docs/Vol6_No1/an_exploratory_study_on_the_use_.htm
- Honebein, P. (1996). Seven goals for the design of Constructivist learning environments. In B. Wilson, *Constructivist learning environments*, pp. 17–24. New Jersey: Educational Technology Publications.
- Jin, L., & Cortazzi, M. (1998). Dimensions of dialogue: Large classes in China. *International Journal of Educational Research*, 29, 739–761.
- Johnson, D. & Johnson, R. (1999). *Theory Into Practice*, 38 (2), 67–73.
- Jonassen, D. H. (1991). Evaluating Constructivistic Learning. *Educational Technology*, 31, 28–33.
- Jonassen, D. H. (2001). Objectivism versus constructivism: Do we need a new philosophical paradigm? In D. Ely and T. Plomp (Eds.) *Classic Writings on Instructional Technology* (pp. 53–65). Englewood: Libraries Unlimited.
- Joo, J. E. (1999). Cultural issues of the Internet in classrooms. *British Journal of Educational Technology*, 30(3), 245–251.
- Keller, J. M. & Suzuki, K. (2004). Learner motivation and E-learning design: a multinationally validated process. *Journal of Educational Media*, 29 (3), 229–239.
- Kirschner, P.A. (2001). Using integrated electronic environments for collaborative teaching/learning. *Research dialogue in learning and instruction*, 2, 1–9.
- Li, N. & Kirkup G. (2005). Gender and Cultural Differences in Internet Use: A Study of China and the UK. *Computers & Education*, 48 (2), 301–317.
- Lizzio, A., Wilson, K., & Simons, R. (2002), University Students' Perceptions of the Learning Environment and Academic Outcomes: implications for theory and practice. *Studies in Higher Education*, 27 (1), 27 – 52.
- Macfadyen, L. P. (2005). The culture(s) of cyberspace. In C. Ghaoui (Ed.), *Encyclopedia of Human-Computer Interaction*. Hershey, PA: The Idea Group, Inc., 2005

- McConnell, D. & Zhao, J. (2006). Chinese higher education teachers' conceptions of e-Learning: Preliminary outcomes. *Proceedings of the 23rd annual ascilite conference: Who's learning? Whose technology?* Ascilite 2006, The University of Sydney, pp. 513-523.
- McLoughlin, C. & Luca, J. (2002). A learner-centred approach to developing team skills through web-based learning and assessment. *British Journal of Educational Technology* 33 (5), 571-582.
- Neo, K. (2003). Using multimedia in a constructivist learning environment in the Malaysian classroom. *Australian Journal of Educational Technology*, 19(3), 293-310.
- Niles, F. S. (1995). Cultural Differences in Learning Motivation and Learning Strategies: A Comparison of Overseas and Australian Students at an Australian University. *International Journal of Intercultural Relations*, 19(3): 369-385.
- Pascarella, E. T., & Terenzini, P. T. (1991). *How college affects students: Findings and insights from twenty years of research*. San Francisco: Jossey-Bass.
- Peng, X. (2004). *The China Papers*, November 2004, Retrieved 8 Sep. 2007 from http://science.uniserve.edu.au/pubs/china/vol4/CP4_ES3.pdf
- Pintrich, P. R. (1989). The dynamic interplay of student motivation and cognition in the college classroom. In C. Ames & M. Maehr (Eds.), *Advances in motivation and achievement: Vol. 6. Motivation enhancing environments* (pp. 117-160). Greenwich, CT: JAI Press.
- Pintrich, P.R., Smith, D.A.F., Garcia, T. & McKeachie, W.J. (1993). Reliability and predictive validity of the Motivated Strategies for Learning Questionnaire (MSLQ). *Educational and Psychological Measurement*, 53, 801-813.
- Ru, J. (2002). A Look at Online University Education in China, *Singapore's e-learning house*, November.
- Stacey, R. D. (2003). *Complexity and group processes: A radical social understanding of individuals*. New York: Brunner-Routledge.
- Stone, C. & Goodyear, P. (1995). *Constructivism and Instructional Design: Epistemology and the Construction of Meaning*. Retrieved 12 April 2008 from <http://domino.lancs.ac.uk/edres/csalt/docs.nsf>
- Thompson, L. & Ku, H-Y. (2005). Chinese graduate students' experiences and attitudes toward online learning. *Educational Media International*, 42 (1), 33-47.

- Tiong, K-M, Yong, S-T. (2004). Confucian heritage culture learners' and instructors' expectations and preferences in collaborative learning: convergence or divergence? Retrieved June 24, 2007, from <http://www.herdsa.org.au/conference2004/Contributions/NRPapers/A055-jt.pdf>
- Van Meter, P. & Stevens, R.J. (2000). The role of theory in the study of peer collaboration. *Journal of Experimental Education*, 69, 113-117.
- Wang, H. (2006). How cultural values shape Chinese students' online learning experience in American universities. Ph.D dissertation, the University of Georgia.
- Watkins, D. & Biggs J. (Eds) (1996). *The Chinese learner: cultural, psychological and contextual influences*. Hong Kong, Comparative Education Research Centre, and Australia, Australian Council for Education Research, Melbourne.
- Watkins, D. A. (2000). Learning and teaching: A cross-cultural perspective. *School Leadership & Management*, 20, 161-173.
- Weinstein, C. E., & Mayer, R. E. (1986). The teaching of learning strategies. In M. Wittrock (Ed.), *Handbook of research on teaching* (pp. 315–327). New York: Macmillan.
- Wilson, B.G (1996). *Constructivist learning environments: Case studies in instructional design*. Englewood Cliffs, NJ: Educational Technology Publication.
- Zhao,Y. (2003). The use of a constructivist teaching model in environmental science at Beijing Normal University. *The China Papers*, July 2003, Retrieved 8 Sep. 2007 from <http://science.uniserve.edu.au/pubs/china/vol2/yezhaohao.pdf>
- Zhu, C., Valcke, M. & Schellens, T. (2008). A cross-cultural study of Chinese and Flemish university students: Do they differ in learning conceptions and approaches to learning? *Learning and Individual Differences*, 18, 120-127.
- Zhu, C., Valcke, M., Schellens, T. & Li, Y. (in press). Chinese Students' perceptions of an e-learning environment and factors affecting their performance: implementing a Flemish e-learning course in a Chinese educational context. *Asia Pacific Education Review*, 10 (2), June 30, 2009.
- Zimmerman, B., & Pons, M. (1988). Construct validation of a strategy model of student self-regulated learning. *Journal of Educational Psychology*, 80, 284–290.

Chapter 6

Online collaborative learning: are there cultural differences in student satisfaction, knowledge construction and academic performance? *

Abstract

Recent studies focusing on Western students indicate that online collaboration enhances student learning achievement (Young, 2008). Yet few empirical studies have analyzed student satisfaction, performance and knowledge construction through online collaboration from a cross-cultural perspective. This study focuses on three key issues in relation to online collaborative learning, namely student satisfaction, knowledge construction during asynchronous group discussions, and student characteristics that influence student online performance and academic achievement. A parallel e-learning environment with online collaborative group work was implemented for a group of Chinese first-year students from Beijing Normal University in China and a group of Flemish first-year students from Ghent University in Belgium. Differences and similarities with regard to student satisfaction and dissatisfaction with online collaborative learning, and their achieved level of knowledge construction are analyzed and discussed. Relationships between student characteristics, online performance and academic achievement were found in this study.

Introduction

In the literature, a growing amount of research focuses on learning in group settings and more specifically on learning in computer supported collaborative learning (CSCL) settings. Group discussion is one of the key activities of collaborative learning during which students develop effective cognitive learning strategies through social interactions. These learning strategies encourage the adoption of a deep learning approach and have been shown to be effective in enhancing student achievements (Tang, 1996). Previous studies

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confirm that student involvement is more intense and equally distributed among group members in CSCL environments as compared to face-to-face sessions (Cooney, 1998). Recent studies indicate that online collaboration such as asynchronous discussion attributes to student learning achievement (Young, 2008).

Cultural context plays an important role in cognitive development of learners through social interaction and discourse (Lave & Wenger, 1991). Cultural attributes can affect online presence and learner perceptions (Thomas, Mitchell & Joseph, 2002). It is important to consider the cultural backgrounds of learners if we are to understand how they respond to computer-based learning (Collis, 1999). Some previous studies have indicated cultural gaps between “Confucian-heritage” and “Western” learners in online collaborative learning environments, however, mostly in Western educational settings. Few empirical studies have focused on student attitudes, behaviours and performance in Chinese educational settings in comparison with Western students in Western educational settings. This study responds to this gap and investigates student satisfaction, performance and knowledge construction through online collaboration in two different cultural settings. The aim of this study is to examine student satisfaction with collaborative e-learning, their levels of knowledge construction during the online asynchronous learning process, and the relationship between learner characteristics, online performance and academic achievement across different cultural contexts.

Student satisfaction with collaborative e-learning and preferences across cultural contexts

The degree of student satisfaction is an important factor in evaluating the effectiveness of e-learning. Previous studies report that students who participated in online collaborative tasks expressed higher levels of satisfaction with their learning process compared to students who didn't participate in online collaborative learning (Jung, Choi, Lim & Leem, 2002). Recent evaluations of Western teaching practices within Asia cast doubt that findings can be transported from one community to the other without an understanding of what important contextual variables are, and how they interact with key educational interventions (Chang & Tsai, 2005). Kim and Bonk (2002) contend that more comparative research is needed within different cultures, situations and content areas, especially learners' interaction online and studies related to the impacts of cultural differences of student online collaboration.

Ramsay (2005) studied the influence of learner distinctions in cultural background on learners' experience of asynchronous computer-mediated

discussions. His results indicate that both Confucian-heritage and Western learners perceived the computer-mediated communication approach as flexible, interesting, of value and providing pedagogical benefit, but Western students were more actively involved in online discussions compared to Confucian-heritage students. Similar results were found in previous research confirming that Confucian-heritage Culture (CHC) students are low participants when it comes to group discussion among peers and teachers (Volet, 1999). These findings indicate that CHC students show a tendency to be introverted and passive, and less active in online collaboration. Feast and Churchman (1997) observed that students from CHC rely on teachers to guide study strategies. Research by Baron (1998) indicates that online interactions among CHC students are largely confined to an instructivist approach on the part of the teacher. A recent study by Smith, Coldwell, Smith and Murphy (2005) found that Chinese students were significantly less comfortable with discussions in e-learning compared to Western students. They also found that Chinese students posted less number of messages associated with content contributions to the online discussions. These results point out there are distinct features in online collaborative learning experience, participation and satisfaction of students from different cultural background.

Computer supported collaborative learning and knowledge construction

CSCL is based on the pedagogical assertion that students learn – construct knowledge – through group interaction (Gerlach, 1994). Collaborative learning involves the joint construction of meaning through interaction with others (Littleton & Hakkinen, 1999). CSCL promotes meta-cognitive processes, reflective interaction, and problem solving (Baker & Lund, 1997; Jonassen & Kwon, 2001). Students are more interested and critical thinking and inquiry is promoted (Duffy, Dueber & Hawley, 1998). Previous research on student learning supports the view that discussion is important (Mayes, 2001). Educational research has shown that more effective learning takes place if learners are actively involved, rather than passive listeners. Wenger (1998) suggests learning should be viewed as a social phenomenon where people develop, negotiate and share understanding. Working together to accomplish a task is seen as a characteristic of a powerful learning environment, which facilitates active construction of knowledge (Van Merriënboer & Paas, 2003). Previous research has reported that students in collaborative learning conditions had more constructive learning processes (Curtis & Lawson, 2001). In the collaborative learning processes, students can share information,

practice critical reflection, negotiate meaning, test synthesis and build consensus. According to Walker (2005), collaborative written assignments, such as developing team reports on specific topics, group answers to discussion questions, debates and critiques of arguments can enhance knowledge construction. The analysis model of Veerman and Veldhuis-Diermanse (2001) builds on social-constructivist principles. It focuses on two main discussion behaviours, namely task-oriented and non-task-oriented communication. The model of Gunawardena et al (1997) proposes a model for evaluating the construction of knowledge through social negotiation. The five phases include sharing and comparing of information, exploring of dissonance, negotiation of meaning, testing synthesis, and agreement statements and applications.

Student characteristics, online performance and academic achievement

CSCCL is often presented as a promising learning method. However, it is also facing some new challenges. Previous research indicates that students from different cultural contexts differ in their learning conceptions and approaches to study (Zhu, Valcke, Schellens, 2008a). Recent studies point at the importance of student characteristics in learning and its relationship to instructional design and learning outcomes (Beatty & Nunan, 2004; Workman, 2004). Laurillard (2002) indicates the importance of 'knowing what students bring to their learning environment'. Recent studies point out that the following presage and process variables in relation to student learning are critical variables: epistemological beliefs, conceptions of learning, approaches to study and learning strategies (Zhu, Valcke & Schellens, 2008b). Learners' perceptions about collaborative learning should also be considered as they influence student attitudes, behaviour and ways of knowledge construction in the learning processes (Fraser, 1998).

Student learning experience, the learning context and the learning outcomes are not to be seen as separate variables and processes (Prosser & Trigwell, 1999). Empirical studies (e.g. Wang, 2004) reveal a positive correlation between students' visible learning behaviours, such as participating in online activities, and their learning outcomes. However, there were very limited empirical studies examining student experiences, attitudes towards these innovative learning environments, and the learning process and outcomes of students in distinct cultural and educational settings.

Research questions

This study focuses on examining the following research questions: 1) Are there cultural differences in student satisfaction and dissatisfaction with the online collaborative learning? 2) Are there cultural differences in the level of student knowledge construction through social interaction in online discussions? 3) What are the relationships between student characteristics in learning, online performance and learning outcomes? In addition, we compare the academic achievements of students in the online group settings with a control group who worked on the assignments individually.

Method

Research setting

The present study was set up as part of a cross-cultural research collaboration between Ghent University and Beijing Normal University. A freshman course on “Instructional Sciences” was implemented in parallel to first-year Chinese and Flemish students majoring in Educational Studies. Next to face-to-face lectures, an e-learning environment was set up. Besides the course information, planning, lecture slides, additional resources, links, calendar, news, etc. that were part of the environment, students had to participate in asynchronous group discussions on assigned tasks. The e-learning is supported by the Minerva (Dokeos) learning platform. The same e-learning system, learning content, discussion tasks were presented to the Chinese and Flemish students involved in this study.

Participants

All first-year students taking the course “Instructional Sciences” in both settings participated in the study. The Chinese students ($n=160$) originated from 24 provinces and municipalities around China. The average age of the Chinese group was 19.3; among them 70% were female, and 30% male students. The Flemish students ($n=305$) originated from various provinces in Flanders. Their average age was 19.8; among them 87% were female and 13% male students.

The students in both contexts were asked to report about their access to computer and Internet (0=no easy access 6=very easy access). The Flemish students (mean=5.33) had an easier access compared to the Chinese students

(mean=4.09) ($p<.000$). Ninety percent of the Flemish students had computer and Internet access at home; and the rest had free access from university PC rooms. Only 9% of the Chinese students had their own computer in their campus dormitories, and the rest had access from university PC rooms at a low fee.

Procedure

All students in both settings were randomly assigned to a group consisting of six to eight students. The online discussion and group work centered on three Instructional Sciences themes: behaviorism, cognitivism, and constructivism. In view of each theme, authentic tasks were presented to the groups of students. For example, the task regarding “cognitivism” was “you are asked by an editor who wants to publish a collection of cognitivist instructional strategies online to write a general framework. Discuss within your group what main content should be included in the introductory framework. Present your framework in one web page, with subdivision/link to different parts.” Students were trained on how to use the e-learning system and how to participate in group discussions. All students got one week for test use.

Students were required to participate in the group discussions and contribute to the group assignments during three months. For each assignment, the students were required to contribute at least twice a week. Three teaching assistants were assigned as supervisors for the Flemish student groups and two assistant teachers in the Chinese context to supervise the Chinese student groups. The supervisors only had to moderate, encourage, and give directions or remarks to each group. Student online contributions were assessed on the basis of qualitative and quantitative criteria that were communicated to the students during the training session. In the Chinese setting, 35 students were randomly selected as a control group. They completed the same assignments related to each theme individually instead of through the online discussion groups. All completed assignments, both by groups and individual students, were evaluated. At the end of the course, a final written test was presented to all students.

Instruments

Questionnaires on student characteristics related to learning

At the beginning of the course, students’ characteristics were measured. We selected four measurements that are closely related to student learning:

epistemological beliefs, learning conceptions, learning approaches and learning strategies. Selected items from the Epistemological Beliefs Questionnaire (Schommer, 1994) were used, focusing on two scales reflecting “certain knowledge” and “fixed ability”. To measure student conceptions of learning, part of the Conceptions of Learning Inventory (Purdie & Hattie, 2002) was used, focusing on the conceptions of learning as ‘remembering’ and ‘understanding’ (10 items, Cronbach’s $\alpha > .78$). Next to that, the short version of the Approaches and Study Skills Inventory for Students (Tait, Entwistle, & McCune, 1998) was used to measure student approaches to study, which reflects three subscales, ‘surface’, ‘deep’ and ‘strategic’ approaches to study (18 items, Cronbach’s $\alpha > .85$). Furthermore, to measure student learning strategies, selected scales from the Motivated Strategies of Learning Questionnaire (Pintrich, Smith, Garcia & McKeachie, 1993) were used, focusing on elaboration, rehearsal, critical thinking, self-regulation, peer learning and help seeking (34 items, Cronbach’s $\alpha > .80$).

Questionnaire on student perceptions of collaborative learning

Student perceptions of collaborative learning, critical thinking, and problem-based-learning were assessed with a questionnaire of 23 items. These items assess the extent to which students appreciate a certain feature of collaborative learning is implemented in their learning environment. The four scales were validated with satisfactory internal consistency (Cronbach’s $\alpha > .75$).

Questionnaire on student satisfaction and dissatisfaction with online collaborative learning

After the online collaborative learning experience, students were asked to fill in a questionnaire about their satisfaction and dissatisfaction with online collaborative learning. This questionnaire consists of 15 questions assessing the satisfaction of collaborative learning and 15 questions for students to choose and rank the aspects that they like or dislike most. Student satisfaction reflects five dimensions: e-learning function, collaborative learning, peer contribution, interaction and group results. The psychometric quality of this measurement was also confirmed (Cronbach’s $\alpha > .70$).

Content analysis

The scripts of fourteen groups of Flemish students and ten groups of Chinese students were randomly selected for content analysis. The data set comprises the transcripts of all messages posted during group discussions by these groups during one semester. We applied the coding scheme of Veerman and Veldhuis-diermanse (2001) to analyze the distribution of communication types, and the coding scheme of Gunawardena, Lowe and Anderson (1997) to analyze the level of social construction of knowledge. In the present research the complete message was used as the unit of analysis. When a message comprises elements of two different levels of knowledge construction, the highest level was assigned. The messages in the transcripts were coded by four independent coders for the Flemish students and three independent coders for the Chinese students. The Chinese and Flemish coders received training by the same researcher to get acquainted with the coding schemes using the same sample data. The inter-rater reliability was checked by determining percent agreement between the raters. For the raters of the Flemish group, the percent agreement was .91; for the raters of the Chinese group, the percent agreement was .86.

Statistical analysis

T-tests were used to analyze the differences between the Chinese and Flemish students regarding their satisfaction and dissatisfaction with the online collaborative learning. Chi square analysis was adopted to compare the student message types and the level of knowledge construction. Multivariate analyses were conducted to test the impacts of student characteristics related to learning and culture on their online performance and learning outcomes. Furthermore, the achievements of Chinese and Flemish students in online group settings were compared to a Chinese control group who completed their assignments individually.

Results*Student satisfaction and dissatisfaction with online collaborative learning*

The results indicate that there were significant differences between Chinese and Flemish students regarding their satisfaction and dissatisfaction with online collaborative learning. A summary of the significant differences between the two groups is presented in Table 1. Compared to the Flemish students, the Chinese students reported a higher level of satisfaction with

online collaborative learning and peer contribution ($p<.006$). The results show that the Chinese group was more satisfied with the equal contribution of group members compared to the Flemish group ($p<.006$). However, the Flemish students were more satisfied with the final results of the online group work compared to the Chinese group ($p<.006$); and they spent more time in average on the online group collaborative learning, 4.87 hours per week versus 2.10 hours per week for the Chinese students. As to the dissatisfaction of students, the Chinese group reported more often a lack of interaction between students and teacher in asynchronous group discussions compared to the Flemish group. The Flemish group reported to a larger extent that it was time-consuming compared to the Chinese group ($p<.001$).

Table 1. Student satisfaction and dissatisfaction with online collaborative learning (scale from 0-6, 0=absolutely not true, 6=very true)

<i>Satisfaction with online collaborative learning</i>	Mean		<i>t</i>	<i>Sig.</i> ^c
	Chinese ^a	Flemish ^b		
Satisfaction with the e-learning functions	4.01	3.45	2.20	.012*
Satisfaction with collaborative learning	4.14	3.44	4.55	.001**
Satisfaction with peer contribution	3.43	2.83	1.81	.003**
Satisfaction with peer interaction	3.60	3.56	.21	.83
Satisfaction with group assignment results	3.85	4.66	-5.86	.000***
<i>Dissatisfaction with online collaborative learning</i>				
Time-consuming	3.24	4.50	-7.34	.000***
Dissatisfaction with task division	2.76	2.25	2.71	.010**
Lack of interaction with teacher	4.09	3.43	3.36	.001**

^a $n=160$; ^b $n=305$; * $p<.05$, ** $p<.01$, *** $p<.001$.

^c Adjustment for multiple comparisons: Bonferroni correction is applied

Similarities in student responses were also found. Both Chinese and Flemish students found it an advantage to be able to work at their own pace and time, and liked online collaborative learning as each group member can contribute his/her part in the group assignments. Both groups reported that online collaborative learning helped them to gain more knowledge than if they would have studied alone. They also stated that they had learned a lot considering the time they've put into the online collaborative learning assignments. The Chinese and Flemish students were similarly satisfied with

the peer interaction and with the technical help they received from the course coordinators. Both groups of students faced similar technical problems, such as losing a contribution after submission, downloading or uploading documents.

The ranking of what students most liked and disliked with regard to online collaborative learning is summarized in Table 2. The Flemish students most of all liked working at their own pace and time, while the Chinese students most of all liked the fact that they could work together with others on the assignments. What the Flemish students disliked most was that it was time-consuming, whereas the first problem the Chinese group reported was the lack of interaction between students and teacher.

Table 2. The ranking of what Chinese and Flemish students were most satisfied and most dissatisfied with online collaborative learning

	Chinese group		Flemish group	
	%	Ranking	%	Ranking
<i>What do you like the most of the e-learning environment?</i>				
Flexibility	48.8	2	56.3	1
Collaborative learning	49.7	1	42.57	2
Peer contribution	21.1	3	40.1	3
<i>What do you dislike the most of the e-learning environment?</i>				
Time consuming	26.7	3	64.1	1
Technical problems	45.6	2	49.3	2
Lack of interaction with teacher	64.4	1	42.6	3

Content analysis of student knowledge construction through social interaction

In average, the Flemish students posted weekly more messages per person (7.5 messages) in asynchronous group discussions compared to the Chinese students (3.9 messages). For both groups, there were no significant differences as to the number of messages posted by male and female students. To test whether the types of messages and the achieved level of knowledge construction differ significantly, chi-square analyses were applied. The distribution of types of message and level of knowledge construction through social negotiation of the two groups are presented in Table 3.

The types of messages posted by both groups were rather similar, with a majority of task oriented messages. The two groups of students seemed to be similar regarding non-task oriented messages that were technical, social or related to planning. With regard to the levels of knowledge construction, the

pattern of both groups was also similar. Both groups contributed a majority of messages that were at the first level of knowledge construction-‘*sharing and comparing information*’. However, Flemish students contributed a higher frequency of messages that were at the second level of knowledge construction-‘*exploration of dissonance*’ compared to Chinese students. Both groups contributed to a similarly lesser extent messages (about 12 %) that were at the third level of knowledge construction-‘*negotiation of meaning*’. Both groups contributed very few messages (less than 4 %) that reached the fourth and fifth levels of knowledge construction.

Table 3. Types of messages and levels of knowledge construction based on the interaction analysis model

	Chinese	Flemish	χ^2	p^c
<i>Types of messages^a</i>				
Task oriented	95.9%	94.2%	0.35	.505
Non-task oriented	4.1%	5.8%	11.25	.006
Irrelevant	0.3%	1%	11.58	.005
Technical	0.1%	0.5%	10.16	.052
Planning	0.7%	1.2%	10.11	.053
Social	3%	3.1%	0.27	.641
<i>Levels of knowledge construction^b</i>				
1. Sharing and comparing information	79.5%	63.7%	1.65	.121
2. Exploration of dissonance	5.4%	19.7%	50.32	.000
3. Negotiation of meaning	11.3%	12.6%	3.88	.054
4. Testing synthesis	1.7%	2.8%	15.77	.005
5. Agreement statements and applications of newly-constructed meaning	2.1%	1.2%	12.10	.006

a. Coding based on Veerman et al., 2001.

b. Coding based on Gunawardena et al., 1997.

c. Adjustment for multiple comparisons: Bonferroni correction is applied.

Relations between student characteristics in learning, online performance and learning outcomes

Multivariate regression analyses were carried out taking culture as an independent variable, and student characteristics in learning, learning preferences, and satisfaction with the e-learning environment as covariant variables, and student performance in online group work and their academic performance as dependent variables. Variables with significant effects and interaction effects with culture are summarized in Table 4. The multivariate tests show that certain knowledge, deep approach, preferences for collaborative learning and satisfaction with the learning environment have a significant effect as a result of Wilk's Lambda ($p < .05$).

Student epistemological belief in 'certain knowledge', conception of learning as 'understanding', and the deep and strategic approaches to learning were significantly related to student performance online and their academic achievement. As for student learning strategies, the 'elaboration' strategy was significantly related to student online performance and academic achievement. Students who had higher preferences of collaborative learning performed better in online group work. Student satisfaction with the e-learning environment was also positively related to student performance in online group work. We found that there was an interaction effect between culture and satisfaction. The results show that Flemish students' satisfaction was positively related to their online performance ($t = 3.44$, $p < .01$), but this impact was not significant for the Chinese students. An interaction effect was also found between culture and epistemological beliefs, and between culture and collaborative learning. The belief in 'certain knowledge' was negatively related to Chinese students' online performance ($t = -3.26$, $p < .01$), but this impact was not significant for the Flemish students. The impact of preferences for collaborative learning on online performance was significant for the Flemish students ($t = 3.18$, $p < .01$), but not significant for the Chinese students.

In order to understand whether collaborative learning enhanced student academic performance, we compared the results of the assignments accomplished by the Chinese students who worked collaboratively online and the students who accomplished the same assignments individually. The results show that the students in the group condition (mean = 5.4 out of 10) had a higher mean score compared to the students in the individual condition (mean = 4.8 out of 10) ($p < .05$, Cohen's $d = .40$). The Flemish students, all in the group condition, had a slightly higher mean score (mean = 5.9 out of 10) compared to the Chinese students in group condition ($p < .05$, Cohen's $d = .31$). But the effect sizes were small based on

the criteria suggested by Cohen (1988). The assessment criteria were the same for both settings although we need to bear in mind that the assessment was made by different teachers. There were no significant differences in the final test score between the Chinese students who were in group or individual condition for the assignment tasks ($p>.05$).

Table 4. Multivariate analyses on the impacts of student characteristics and culture on their performance in online group work and academic achievement

	Performance in online group work		Academic achievement		Multivariate tests (Wilks' Lambda)	
	F	Sig.	F	Sig.	F	Sig.
<i>Epistemological beliefs</i>						
Certain knowledge	8.81	.003**	5.20	.023*	8.72	.000***
<i>Learning conceptions</i>						
Understanding	9.47	.002**	5.66	.018*	.18	.83
<i>Learning approaches</i>						
Deep approach	6.48	.010*	9.11	.002**	2.81	.044*
Strategic approach	13.69	.000***	7.54	.007**	1.02	.31
<i>Learning strategies</i>						
Elaboration	6.52	.011*	5.09	.025*	.34	.71
<i>Preferences for collaborative learning</i>						
Collaborative learning	4.36	.037*	.11	.75	10.29	.000***
<i>Satisfaction with the e-learning environment</i>						
Satisfaction with the e-learning environment	14.67	.000***	.27	.61	8.50	.000***
<i>Interaction effect</i>						
Culture * Satisfaction	1.79	.008**	.48	.99	1.15	.22
Culture * Epistemological beliefs (Certain knowledge)	2.18	.032*	.67	.75	2.69	.039*
Culture * Collaborative learning	2.46	.007**	.33	.99	.84	.76

Note: Only variables with at least one significant effect were reported.

* $p<.05$. ** $p<.01$. *** $p<.001$.

Discussion

This study focuses on three key issues in relation to online collaborative learning, namely student satisfaction and dissatisfaction, knowledge construction during asynchronous group discussions, and student characteristics in learning that influence student online performance and academic achievement.

Surveying students' satisfaction with collaborative e-learning is a critical issue in promoting the innovative use of modern educational technology, especially in different cultural contexts. Our results indicate that there were significant differences between Chinese and Flemish students regarding their satisfaction and dissatisfaction with online collaborative learning. In average, the Flemish students spent more time in online collaboration and were more satisfied with the results of group work compared to the Chinese students. The Chinese students enjoyed online collaborative learning to a greater extent and were happier with the contributions of group members compared to the Flemish students. Both groups of students were satisfied with the functions of the e-learning environment, appreciated the opportunities to work collaboratively and agreed that collaborative learning promotes deeper understanding of the learning content. The results are consistent with previous studies that students in general are satisfied with online collaborative learning (Dewiyanti, Brand-Gruwel, Jochems & Broers, 2007). The Flemish students ranked flexibility in time and space as the main advantage of e-learning, and the Chinese students found that working collaboratively online was a big advantage. Both groups of students were positive about working on a group product.

As to student dissatisfaction, the Chinese students found that the lack of teacher guidance and interaction in the e-learning environment was the biggest problem for them. Although the teacher guidance was at about the same level for the Flemish students, the latter found it less of a problem. This might be due to the different expectations of teacher's involvement of the two distinct groups. Teachers or tutors play a very important role in Chinese educational contexts. Observations of the current e-learning programs in China indicate that e-learning tends to be heavily instructor-centered, for example using video lectures online. Other studies also comment that Chinese e-learners found it problematic when teacher or tutor presence is low (Friesner & Hart, 2004). This could also be because of the low ambiguity tolerance of Chinese students who expect the presence of expert and certain knowledge (Zhu, Valcke, Schellens, 2008b), which leads for a stronger need for feedback and teacher

help in the learning environment (Anderson, 2000). The 'new and exciting' online collaborative learning approach did not result in more intensive involvement of the Chinese participants; they were less active than Flemish students in terms of the time spent online and the messages posted. This might be because the Chinese students were less familiar with this type of learning approach compared to the Flemish students. It might also be related to the fact that Chinese students had not as easy access to computer and Internet and were less familiar with computer use compared to Flemish students (Zhu, Valcke, Schellens, 2008c). Flemish students rated 'time-consuming' as the primary problem, but most probably thanks to their extensive participation, they were quite satisfied with their final results of group work. Another negative effect was the technology dimension, which was reported as the second problem by both groups of students. This is not surprising for new learners in e-learning, but attention should be paid in future to provide more appropriate training and technical support to students (Fallshaw & McNaught, 2005).

At the learning process level, Chinese students posted relatively less non-task oriented messages compared to Flemish students but for both groups, the majority of group communications were task-oriented. Activities such as asking, arguing, explaining, and providing extra resources dominated the discussions. These findings are in line with previous studies on online collaborative learning (Schellens & Valcke, 2006). At the knowledge construction level, the results show that for both Chinese and Flemish students, a majority of messages have been coded as level 1 (sharing and comparing of information). However, Flemish students posted more messages of level 2 (exploration of dissonance). This might be due to the fact that Chinese students did not want to openly disagree with their group members. There were fewer messages reaching the higher levels of knowledge construction. This distribution of students' contributions across the five levels of knowledge construction corresponds with previous findings that few messages reach the fourth and fifth level, and a majority of messages are at the first level (Gunawardena et al., 1997; McLoughlin & Luca, 2002). This could be explained by the learning habits of students. Students, especially freshmen, are not yet used to test syntheses, summarize agreements, and to apply newly constructed knowledge. They applied more often the first level of knowledge construction which is a prerequisite for a discussion and maintaining the interaction flow. These contributions are in a way indispensable in order to elicit contributions at a higher level of knowledge construction. As the discussion tasks were new to students for each theme in our study, we did not

expect significant differences between the discussion themes. Related studies of De Wever, Van Keer, Schellens and Valcke (2007) involving content analyses of student asynchronous discussions in similar Flemish setting indicate that there was no gradual increase of students' level of knowledge construction throughout the different discussion themes as the discussion tasks of each theme were new to students.

Student characteristics related to learning, such as epistemological beliefs, conceptions of learning, approaches to study, and learning strategies were found to be critical factors related to student online performance and academic achievement. Student perception of collaborative learning was also an important factor to predict student online group collaboration. The results show that understanding, the deep and strategic approaches to study, and elaboration are especially important for fostering student performance in collaborative e-learning settings. Previous research put forth that student attitudes towards collaborative learning might inhibit or promote their participation in the collaborative learning process (Kagan, 1994). Our results show that student perceptions of collaborative learning and group work were positively associated with their online performance in group work.

Our results reveal that the Chinese students in the group condition excelled the students in the individual condition in the results for their assignment. This was probably because the groups could integrate different points of views by working collaboratively and their perspectives became more comprehensive than the students who worked individually. The Flemish students performed better for the group assignments compared to the Chinese students. This might be related to the more intensive involvement of the Flemish students. In addition, easier computer and Internet access might also explain this.

Student perceived satisfaction, their knowledge construction processes and performance in online collaborative learning are important factors to determine whether an innovative learning approach can be applied in a sustainable way. Our study confirms that there are significant cultural differences in student satisfaction, knowledge construction, and academic achievement in an innovative e-learning environment. It has to be noted that although we have identified a series of differences and similarities between the two cultural groups, individual differences should not be neglected. Our relational analyses between student characteristics and their performance depicted the influences of individual characteristics.

Limitation and implications

It has to be noted that the results should be considered in a cautious way as the study is applied in specific settings. There is also a limitation as to the number of participants involved, especially samples involved in the group and individual conditions, as only 35 students were randomly assigned to the latter condition. Therefore, the results should be interpreted with caution. It was not possible to generate these two conditions in the Flemish setting due to various practical, ethical and administrative reasons.

As to the methodological limitations, although we tried to control several educational setting variables, we realize that there are other variables such as social and economic environment, educational systems, campus environment, which might have influenced student satisfaction, participation and performance in the collaborative e-learning settings. At the content analysis level, quantitative content analysis was opted because of the large amount of messages. Future research could include more detailed and qualitative discourse analysis. In addition, the levels of knowledge construction might be influenced by the types of discussion tasks and structuring support, which could be examined in following studies. There are other coding schemes that can be used to analyze online collaborative behaviours. We used only two coding schemes to analyze online collaborative behaviours in this study and it could have been analyzed in more diverse dimensions. Furthermore, this study was only conducted in one Chinese and one Flemish setting. It is suggested that a multilevel approach could be one of the approaches to cope with the methodological challenges of cross-cultural research (Fontaine, 2008). Such an endeavour in future studies would be very valuable. Furthermore, besides learner's attitudes, instructors' attitudes towards innovative teaching and the use of learning technology should be examined in future studies.

The study provides a clear understanding that cultural context needs to be considered with regard to instructional design in different cultural contexts. Student epistemological beliefs, conceptions of learning, approaches to study, learning strategies, preferences for collaborative learning, and satisfaction with the e-learning environment are also important variables influencing student learning, especially in a student-centred e-learning environment. Understanding these variables would be helpful for instructors to design meaningful educational activities to promote student knowledge construction and make learning more effective and appealing for students.

References

- Anderson, M. (2000). Individual Characteristics and Web-based Courses. In C. R. Wolfe (Ed.), *Learning and teaching on the World Wide Web* (pp. 47-73). San Diego: Academic Press.
- Baker, M., & Lund, K. (1997). Promoting reflective interactions in a CSCL environment. *Journal of Computer Assisted Learning*, 13, 175-193.
- Baron, J. (1998). Teaching on-line across cultures, in: A. Gooley, C. Pearson, S. Towers et al. (Eds) *Proceedings of the 3rd International Conference on Open Learning*, Brisbane, December (Brisbane, Queensland Open Learning Network), 67-72.
- Beatty, K., & Nunan, D. (2004). *Computer-mediated collaborative learning*. System, 32(2), 165-183.
- Chang, C. Y. & Tsai, C. C. (2005). The interplay between different forms of CAI and students' preferences of learning environment in the secondary science class. *Science Education*, 89(5), 707-724.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.
- Cohen, E. G. (1994). Restructuring the classroom: conditions for productive small groups. *Review of Educational Research*, 64(1), 1-35.
- Collis, B. (1999). Designing for differences: cultural issues in the design of WWW-based course-support sites. *British Journal of Educational Technology*, 30 (3), 201-215.
- Cooney, D. H. (1998). Sharing aspects within Aspects: Real-time collaboration in the high school English classroom. In C. J. Bonk & K. S. King (Eds.), *Electronic collaborators: Learner-centered technologies for literacy, apprenticeship, and discourse* (pp. 263-287). Mahwah, NJ: Erlbaum.
- Curtis, D. D. & Lawson, M. J. (2001). Exploring collaborative online learning. *Journal of Asynchronous Learning Network*, 5(1), 21-34.
- De Wever, B., Van Keer, H., Schellens, T., & Valcke, M. (2007). Applying multilevel modelling on content analysis data: Methodological issues in the study of the impact of role assignment in asynchronous discussion groups. *Learning and Instruction*, 17, 436-447.
- Dewiyanti, S., Brand-Gruwel, S., Jochems, W., & Broers, N. J. (2007). Students' experiences with collaborative learning in asynchronous computer-supported collaborative learning environments. *Computers in Human Behavior*, 23, 496-514.
- Duffy, T.M., Dueber, B., & Hawley, C.L. (1998). Critical thinking in a distributed environment: A pedagogical base for the design of

- conferencing systems. In C.J. Bonk & K.S. King (Eds.), *Electronic Collaborators: Learner-Centered Technologies for Literacy, Apprenticeship, and Discourse* (pp. 51-78). Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Entwistle, N. & Tait, H. (1990) Approaches to learning, evaluations of teaching, and preferences for contrasting academic environments, *Higher Education*, 19, 169–194.
- Fallshaw, E. & McNaught, C. (2005). Quality assurance issues and processes relating to ICT-based learning. In S. Fallows & R. Bhanot (Eds), *Quality issues in ICT-based higher education* (pp. 23–36). Oxon: RoutledgeFalmer.
- Feast, V. & Churchman, D. (1997). The CHC student success story: a case study in one Australian University, in: R. Murray-Harvey & H. C. Silins (Eds) Proceedings of the 1997 Annual Conference of Higher Education Research and Development Society of Australasia, Glenelg, Adelaide, South Australia, Higher Education Research and Development Society, 8-11 July.
- Fontaine, J.R. (2008). Traditional and multilevel approaches in cross-cultural research: an integration of methodological frameworks. (ed.) in van de Vijver, van Hemert & Poortinga (2008) *Multilevel analysis of individuals and cultures*. Lawrence Erlbaum Associates. New York /London.
- Fraser, B.J. (1998). Classroom environment instruments: Development, validity and applications. *Learning Environment research*, 1,7-33.
- Friesner, T. & Hart, M. (2004) "A cultural analysis of e-learning for China". *Electronic Journal of eLearning*, Vol. 2(1) March.
- Gerlach, J.M. (1994). Is this collaboration? In K. Bosworth & S.J. Hamilton (Ed.), *Collaborative learning: Underlying processes and effective techniques*, San Francisco: Jossey-Bass.
- Gunawardena, C. N., Lowe, C. A., & Anderson, T. (1997). Analysis of a global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. *Journal of Educational Computing Research*, 17, 397-431.
- Jonassen, D.H., & Kwon, H.I. (2001). Communication patterns in computer mediated and face-to-face group problem solving. *Educational Technology Research & Development*, 49, 35-51.
- Jung I, Choi S., Lim C. & Leem J. (2002). Effects of Different Types of Interaction on Learning Achievement, Satisfaction, and Participation in Web-Based Instruction, *Innovations in Education and Teaching International* (39:2), 153-162.

- Kagan, S. (1994). *Cooperative Learning*. San Clemente, California: Kagan Publishing.
- Kim, K.J., & Bonk, C.J. (2002). Cross-cultural comparisons of online collaboration. *Journal of Computer-Mediated Communication* 8(1). Retrieved May 20, 2008, from: <http://www.blackwell-synergy.com/doi/full/10.1111/j.1083-6101.2002.tb00163.x>
- Lave, J., & Wenger, E.(1991). *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.
- Laurillard, D. (2002). *Rethinking University Teaching: a conversational framework for the effective use of learning technologies* (2nd ed.) RoutledgeFalmer, London.
- Littleton, K. & Häkkinen, P (1999). Learning Together: Understanding the Processes of Computer- Based Collaborative Learning. In: Dillenbourg, P. (ed.): *Collaborative learning, cognitive and computational approaches* (pp. 20-30). London.
- Mayes, T. (2001). Learning technology and learning relationships, in: J. Stephenson (Ed.) *Teaching & learning online pedagogies for new technologies* (London, Kogan Page) 16–25.
- McLoughlin, C. & Luca, J. (2002). A learner-centred approach to developing team skills through web-based learning and assessment. *British Journal of Educational Technology*, 33 (5), 571–582.
- Pintrich, P.R., Smith, D.A.F., Garcia, T. & McKeachie, W.J. (1993). Reliability and predictive validity of the Motivated Strategies for Learning Questionnaire (MSLQ). *Educational and Psychological Measurement*, 53, 801-813.
- Prosser, M. & Trigwell, K. (1999). *Understanding Learning and Teaching*. Buckingham, Society for Research into Higher Education and Open University Press.
- Purdie, N., Hattie, J. (2002). Assessing Students' Conceptions of Learning. *Australian Journal of Educational & Developmental Psychology*. 2, 17-32.
- Ramsay, G. (2005). Computer-mediated Communication and Culture: a comparison of 'Confucian-heritage' and 'Western' learner attitudes to asynchronous e-discussions undertaken in an Australian higher educational setting, *E-Learning*, 2(3), 262-275.
- Schellens, T., & Valcke, M. (2006). Fostering knowledge construction in university students through asynchronous discussion groups. *Computers & Education*, 46, 349-370.

- Schommer, M. (1994). Synthesizing epistemological belief of research: tentative understandings and provocative confusions. *Educational Psychology Review*, 6(4), 293-319.
- Smith, P. J., Coldwell, J., Smith, S. N., & Murphy, K. L. (2005). Learning through computer-mediated communication: A comparison of Australian and Chinese heritage students. *Innovation in Education and training International*, 42 (2), 123-134.
- Tang, C. (1996). Collaborative Learning: the Latent Dimension in Chinese Students' Learning. In Watkins, D. A., & Biggs, J. B. *The Chinese Learner: Cultural, Psychological and Contextual Influences*. CERC: The University of Hong Kong. 183-204.
- Tait, H., Entwistle, N.J. & McCune, V. (1998). "ASSIST: a reconceptualization of the approaches to study inventory", In: Rust, C., eds, *Improving Student Learning* (The Oxford Centre for Staff and Learning Development, Oxford Brookes University), 262-270.
- Thomas, M., Mitchell, M. & Joseph, R. (2002). The third dimension of ADDIE: A cultural embrace. *Tech Trends*, 46 (2), 40-45.
- Van Merriënboer, J. J. G., & Paas, F. (2003). Powerful learning and the many faces of instructional design: towards a framework for the design of powerful learning environments. In E. De Corte, L. Verschaffel, N. Entwistle, & J. J. G. Van Merriënboer (Eds.), *Powerful learning environments: Unravelling basic components and dimensions*. Oxford: Elsevier Science.
- Veerman A., & Veldhuis-Diermanse, E. (2001). Collaborative learning through computer-mediated communication in academic education. In P. Dillenbourg, A. Eurelings, & K. Hakkarainen (Eds.), *European Perspectives on Computer-Supported Collaborative Learning. Proceedings of the First European Conference on CSCL*. Maastricht: McLuhan Institute, University of Maastricht.
- Volet, S. (1999). Learning Across Cultures: Appropriateness of Knowledge Transfer. *International Journal of Educational Research*, 31, 625 – 643.
- Walker, G. (2005). Critical thinking in asynchronous discussions. *International Journal of Instructional Technology and Distance Learning*, 6(2). Retrieved 5 Jan, 2008 from http://itdl.org/Journal/Jun_05/article02.htm
- Wang, M. J. (2004). Correlational analysis of student visibility and learning outcomes in an online setting. *Journal of Asynchronous Learning Networks*, 8 (4), 71-82.

- Wenger, E. (1998). *Communities of practice: learning, meaning and identity*. Cambridge, Cambridge University Press.
- Workman, M. (2004). Performance and perceived effectiveness in computer-based and computer-aided education: Do cognitive styles make a difference? *Computers in Human Behavior*, 20, 517-534.
- Young, A. (2008). Structuring Asynchronous Discussions to Incorporate Learning Principles in an Online Class: One Professor's Course Analysis, 4(2), 217-225.
- Zhu, C., Valcke, M. & Schellens, T. (2008a). A cross-cultural study of Chinese and Flemish university students: Do they differ in learning conceptions and approaches to learning? *Learning and Individual Differences*, 18, 120-127.
- Zhu, C., Valcke, M. & Schellens, T. (2008b). The Relationship between epistemological beliefs, learning conceptions, and approaches to study: a cross-cultural structural model? *Asia Pacific Journal of Education*, 28 (4), 411-423.
- Zhu, C., Valcke, M., & Schellens T. (2008c). Collaborative learning in a social constructivist e-learning environment: a cross-cultural study. Proceedings of the 13th Annual Conference of the European Learning Styles Information Network. 617-630.

Chapter 7

A cross-cultural study of teacher perspectives on teacher roles and adoption of online collaborative learning in higher education *

Abstract

This study aims to understand teachers' perspectives on their roles in higher education, their views about the adoption of a social constructivist approach to teaching and learning and the integration of online collaborative learning in blended learning environments in higher education from a cross cultural perspective. We interviewed 60 Chinese teachers from Beijing Normal University and Capital Normal University in Beijing, China and 30 Flemish teachers from Ghent University in Flanders, Belgium. The results revealed differences and specific similarities in perspectives between the Chinese and Flemish university teachers. The cultural and educational context is taken into consideration when discussing the results.

Introduction

During the last two decades, many initiatives to modernize education and to optimize student learning have been studied. These studies involve collaborative learning, problem-based learning, task-based learning, asynchronous group discussions, etc. The innovations are heavily influenced by constructivist learning principles since they stress learning to be an active, constructive process in which the learner builds an internal representation of knowledge and a personal interpretation of experience (Bednar, Cunningham, Duffy & Perry, 1992). Additionally, there is strong emphasis on collaboration between learners and with practitioners in the society (Lave & Wenger, 1991; McMahon, 1997). The introduction of information and communication technologies has made it possible to implement these principles in innovative electronic learning environments. The social-constructivist view has also heavily influenced the pedagogical dimension of e-learning, whereas initial e-

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learning focused on the “delivery” of content. Kirschner & Paas (2001) put forth that computer-supported collaborative learning (CSCL) environments can be considered as social constructivist learning environments that form the present and the future of learning.

The adoption of e-learning is not just about technology. The adoption of instructional strategies is closely related to teachers’ perceptions of their roles and perspectives about teaching and learning (Robertson, 2004). Zemsky and Massy (2004) report that one of the main reasons for e-learning adoption in tertiary education is related to the adopters’ teaching principles. They also point out that active learning and new roles for teachers and students are the necessary components of the innovation adoption cycle. Furthermore, teachers’ perspectives, views and perceptions are linked to the specific cultural contexts where the teaching and learning takes place (Ramsden, 2003). The question arises whether the implementation of an innovation is in line with teacher views, perceptions and perspectives on teaching and learning, and whether an innovation is compatible with the socio-cultural values of the adopters. This is of importance since the actual adoption of the innovations does not always seem to be successful, or remains rather limited.

In this study we aim to investigate and understand teachers’ perspectives on the social constructivist approach to teaching and learning, their perceptions of teacher roles, and their views about the application of online collaborative learning. In doing this, we contrast teachers from Chinese and Flemish (Dutch speaking part of Belgium) cultural and educational contexts.

Theoretical background

Chinese and Flemish cultural and educational context

Culture shapes people’s values, perceptions and behaviour (Berry et al., 2002). It serves as a perceptual framework that guides the interpretation of interactions and the construction of meanings (Cortazzi, 1990). Previous research points out that individualist and collectivist cultures not only influence people’s different senses of self, but also their cognitive processes (Triandis, McCusker & Hui, 1990). In individualistic cultures, people tend to be more direct to speak out, question or be confrontational; whereas in collectivistic cultures, people tend to avoid conflict and use more intermediaries. The former indicates a higher respect for individuality and the latter a higher respect for authority. The Flemish culture is situated in a Western setting, which is more individualistic, while previous studies

identified that the Chinese culture, as part of the Confucian-heritage cultures is traditionally a representative of a collectivistic culture (Baron, 1998; Hofstede, 1986). However, attention should be paid that some cultures that are traditionally collectivist have been shifting towards individualist tendencies, and some individualist cultures have also collectivist qualities (Triandis, McCusker & Hui, 1990). Besides the 'collectivism vs. individualism' dimension, 'power distance' (high vs. low) is another important cultural dimension, which specifies the degree to which less powerful people in a society accept inequality in power. Previous research indicates that in high power distance cultures, students tend to be more passive and may be reluctant to participate in communicative activities as they are not used to speaking in front of their superiors (Ryan, 2000). Former studies put forth that Chinese culture is higher on power distance compared to many Western countries (Hofstede & Bond, 1984); however, in the last two decades, a mixture of cultural values have been developed in China. Therefore, a study of the current cultural and educational contexts, including the power distance between teachers and students, and the collectivist and individualist dimension can be very helpful for understanding the teacher roles, and teachers' perspectives about teacher-student interaction and peer collaboration.

Teacher roles

In research about modern approaches to teaching, the distinction is often made between the teacher-centred orientation and the student-centred orientation to teaching (Kember, 1997). This shift from teacher-orientation to student-orientation originates from ideas in constructivism (Ertmer & Newby, 1993). Central in this transition is the role of students and teachers. Students are expected to actively construct their knowledge, and the teacher role is to stimulate the construction of powerful knowledge (Harris & Alexander, 1998). Grasha (1994) studies five teaching styles that actually reflect five different roles of teachers in the teaching and learning process: expert (transmitter of information); formal authority (sets standards and defines acceptable ways of doing things); personal model (teaches by illustration and direct example); facilitator (guides and directs by asking questions, exploring options, suggesting alternatives); and delegator (develops students ability to function autonomously). In the teaching and learning environment, teacher roles towards students or the interaction models between teachers and students are a central issue. Therefore, in this study, we adopt teacher role as the main concept and investigate how teacher perceptions of their roles would be associated with their adoption of educational innovations.

The adoption of specific teacher roles in the instructional process may facilitate or hinder students' ability to acquire content and skills. Among the five teacher roles presented by Grasha (1994), it is suggested that instructors adopting the social constructivist approach would adapt to the role of a facilitator or delegator, and would less likely play the role of an authority, an expert or a model (Bauersfeld, 1995). The new framework for teaching competencies proposed by Tigelaar et al. (2004) stresses that teachers should be expert on content knowledge, as well as facilitator of learning processes, organizer, and scholar/lifelong learner. The shift from being as a teacher who "gives" a didactic lecture to a facilitator or delegator who helps the learner to develop his or her own understanding of the learning content implies that a facilitator or a delegator needs to display a totally different set of skills than an information or knowledge transmitter (Gamoran, Secada & Marrett, 1998).

It has to be noted that almost every teacher adopts different roles to varying degrees. In different cultural contexts, there are common features of teacher roles, while at the same time a different emphasis can be laid or additional roles are played. Teacher roles can be generally related to two conceptions of teaching and learning (Cortazzi, 1990). One perception views them as hierarchical, positioning the teacher as all knowing and his/her knowledge as being transmitted directly to learners. Another perception views the relationship between the teacher and students as more egalitarian. Previous research has often associated the first perception high-context cultures, such as the Chinese culture, in which teachers are *authoritarian* (Cortazzi, 1990 p. 58). The latter perception is often linked to low-context cultures that emphasize individual development, innovation and an egalitarian ambiance (McClure, 2003). Cortazzi (1990) stresses that both perceptions "are present in most cultures but receive very different emphasis, with the result that varied expectations come about, affecting presuppositions about learning and teaching". In the Chinese context, Chinese students are expected to "respect the teacher's authority without preconditions" (Wang & Mao, 1996, p. 148). Besides their *authority* and *expert* roles, teachers also seem to take up some additional roles, such as "parent" role (Wan, 2001). This parental role makes the teacher-student relationship appear not as cold or authoritarian as they at first appear (Cortazzi & Jin, 1996). Moreover, teachers are expected to act as *models*, and relate students' intellectual development to their moral and personal development (Gao & Watkins, 2002). In contrast to the Western context, Chinese student-teacher relationship seems to be not limited to the classroom and the academic work of that arena (Pratt et al., 1999).

Teacher perspectives on the social constructivist approach to teaching and learning and the adoption of online collaborative learning

Based on phenomenographic research, an abundant literature is now available about teacher conceptions of teaching and learning (Martin & Ramsden, 1994; Trigwell & Taylor, 1994). Teachers differ in their conceptions of teaching and learning. Conceptions of teaching and learning can be placed on a continuum between a *teacher-centred/content-oriented* pole, and a *student-centered/learning-oriented* pole (Kember, 1997). Conceptions in relation to the former position are in line with objectivist traditions that stress the transmission of knowledge (Valcke et al., in press). Conceptions in relation to the latter position are compatible with educational innovations based on constructivism and social constructivism. Social constructivism emphasizes that individuals make meaning through interactions with each other; thus emphasizing the importance of the interaction between student and instructor, and between students (Duffy & Jonassen, 1992). Previous research clearly shows that teacher conceptions are reflected in their teaching practices (Jonassen et al., 1995). Therefore, we expect that the adoption of educational innovations can only take place when they are congruent with specific teacher conceptions.

Online collaborative learning allows learners to share multiple perspectives, and to develop critical thinking skills through the process of judging, valuing, supporting, or opposing different viewpoints (Stacey, 1999). This is also in tune with criteria to achieve meaningful learning (Löfström & Nevgi, 2007). Previous studies provide clear evidence about the beneficial impact of collaborative learning in face-to-face learning settings (Slavin, 1996). Recent studies also give growing evidence about the beneficial effect of learning in CSCL settings (Schellens & Valcke, 2005).

Building on the earlier discussion about teacher perspectives on teaching and learning, the question is how are these perspectives related to the adoption of e-learning and CSCL. Teacher perceptions of the instructional innovation influence the success of teaching and learning in a new learning environment (Simplicio, 2004). Therefore, it is important to find out how teachers think about teaching innovations and what factors influence their perspectives and innovation adoption (Konings, Brand-Gruwel & van Merriënboer, 2007).

Research questions

This study investigates how teachers – working in two different cultural and educational settings - perceive their teacher roles, the social constructivist learning principle, and their willingness to adopt online collaborative learning. More specifically, the research questions are: (1) are there differences in the cultural environment specifically related to teaching and learning? (2) are there differences between Chinese and Flemish teachers regarding their perspectives on teacher roles, the social constructivist approach to teaching and learning, and online collaborative learning? (3) what factors are related to teacher's adoption of e-learning?

Method*Research design***Participants**

The participants in the study consisted of 60 teachers working at Beijing Normal University or Capital Normal University in Beijing, and 30 teachers at Ghent University. Participants were volunteers, but an attempt was made to select a representative sample in terms of gender and age. The educational backgrounds of the teachers are similar. Almost all teachers (professors, associate professors and lecturers) hold a Ph.D degree in psychology or educational sciences. The mean age of Chinese teachers was 39 years ($SD=7.95$), and the mean age of Flemish teachers was 41 years ($SD=9.52$). The samples were well distributed in terms of gender and age (Table 1). Both interview data and quantitative data were collected from the participants. All teachers teach at least one course for undergraduate students in educational sciences, and some teach both at undergraduate and postgraduate level. The study focused on their teaching position at undergraduate level.

Interviews

The interviews with Chinese and Flemish teachers were organized during four months in Beijing and in Ghent separately. All interview questions were semi-structured and open-ended. The interview questions were designed by the three researchers of this study. The first author acted as the interviewer in both settings. The interview questions focused on teacher perspectives on

educational innovations (especially in relation to the use of e-learning format) in higher education, teacher roles, perceptions of teaching and learning relating to the social-constructivist paradigm, and their perspectives in relation to online collaborative learning. When a certain question was not well understood by the interviewee, more explanation was given by the interviewer. All teachers were interviewed individually. Each interview lasted for about 45 minutes to one hour. Often additional questions were asked to clarify related issues or to explore unique experiences of the interviewees. Informed consent was obtained from the participants to record the interview. All teachers were asked to answer the questions while building on their experiences with a particular course they teach at undergraduate level.

Table 1. Number of participants in the study in relation to their background characteristics

	Flemish	Chinese
Total participants	30	60
Female	13 (43%)	32 (53%)
Male	17 (57%)	28 (47%)
Number of teachers $\leq M$	16 (53%)	35 (58%)
Number of teachers $> M$	14 (47%)	25 (42%)

M = mean age.

Questionnaires

All participants filled out the Cultural Environment Survey and the Teaching Style Inventory. The Cultural Environment Survey is a 10-item questionnaire based on the inventory adopted by Wang (2004) that was used to analyze cultural factors in an online learning environment. Wang used the Socio-Cultural Environment Scale of Jegede and Okebukola (1990) as reference for designing the questionnaire. The Jegede and Okebukola questionnaire includes 30 items, reflecting five subscales: authoritarianism, goal structure, African worldview, societal expectation, and sacredness of science. The inventory used by Wang included 25 items, reflecting five dimensions: power-distance, collectivism versus individualism, femininity versus masculinity, uncertainty avoidance, long-term versus short-term time orientation. Reviewing the relevant literature studying the cultural and contextual factors relating to learning environments (Moos, 1979; Okebukola, 1986; Hofstede, 1984; Fisher & Waldrup, 1999), we identified three key conceptual constructs that are closely linked to teacher-student and student-student interactions: power distance, collaboration and competition. Therefore, we adopt these three key

constructs for the purpose of this study. From the Cultural Environment Inventory of Wang (2004), we used the items reflecting the selected three constructs. The collaboration and competition dimensions come from the collectivism and individualism dimensions. Furthermore, minor language modifications were made for the Chinese and Flemish versions applied respectively. A confirmatory factor analysis confirmed the three-factor constructs ($GFI > .91$, $X^2/df < .28$).

We applied the Teaching Style Survey developed by Grasha and Riechmann (1990) reflecting five scales that centre on specific teacher roles: expert, authority, personal model, facilitator and delegator. All 40 items from the original instrument were used, with only minor language adaptations when translated into Chinese and Dutch respectively. When filling out the instruments, teachers were asked to reply to the items by reflecting on their experiences with a particular undergraduate course. Questionnaire items required respondents to indicate on a five-point scale to what extent they agree/disagree with this item. The questionnaire was administered before the face-to-face interview to avoid possible bias. In Table 2 and 3 we report reliability indices of both questionnaires and present some sample items.

Data analysis

Interview data were analyzed with ATLAS.ti 5.2. The analysis was based on the transcripts of the interviews from audio recording. A content analysis approach was adopted to analyze the responses to the open-ended questions in the semi-structured interview. Interview responses were coded to find “themes” that represent the central ideas in the teachers’ responses. The themes were defined based on the major concepts mentioned by the teachers, for example, “factual knowledge is important”, “distances between professors and students are smaller than before”, “teaching is not transmission”. Based on the major themes, a code is given to an analyzing unit (often a sentence or an extended sentence). Coding continued until a saturated list of themes was attained. Based on these codes, a higher order code was given corresponding to our research questions, for example, “supporting the social-constructivist approach”. The coding of the transcripts was conducted by three independent coders. The percent agreement between the raters reached .88.

The analyses focused on variations in responses between the two cultural groups, between male and female teachers, and between “younger” and “elder” teachers. Quantitative data were analyzed on the base of descriptive statistics, *t*-tests, and correlation analyses.

Table 2. Reliability indices of the Cultural Environment Survey

	No. of items	Sample items	Cronbach's alpha
Power distance teacher-student	4	<i>Students should accept the statements and ideas of the teachers and question them only under special circumstances.</i>	.79
Collaboration	3	<i>Students should cooperate in groups during course activities.</i>	.76
Competition	3	<i>I encourage individual competition during course activities.</i>	.74

Table 3. Reliability of the scales on teacher roles

Teacher's role	No. of items	Sample items	Cronbach's alpha
Expert	8	<i>Facts, concepts, and principles are the most important things that students have to acquire.</i>	.70
Authority	8	<i>I set high standards in this class.</i>	.75
Model	8	<i>What I say and do "models" appropriate ways for students to think about the course content.</i>	.76
Facilitator	8	<i>Small group discussions are adopted to help students to develop their ability to think critically.</i>	.80
Delegator	8	<i>Students in this course are engaged in self-initiated and self-directed learning experiences.</i>	.71

Table 4. Cultural Environment Survey: Flemish and Chinese teacher perspectives

	Chinese faculty ^a	Flemish faculty ^b	
	<i>M</i> (<i>σ</i>)	<i>M</i> (<i>σ</i>)	<i>p</i> ^c
Power distance teacher-student	3.25 (.73)	3.22 (.70)	.43
Collaboration	4.33 (.48)	4.29 (.51)	.36
Competition	3.80 (1.04)	2.21 (1.10)	<.000

^a *n*=60; ^b *n*=30; ^c Adjustment for multiple comparisons: Bonferroni correction is applied.

Results

Cultural dimensions in the teaching and learning environment

Based on the survey, Chinese and Flemish teachers' perspectives on power distance, collaboration and competition were analyzed. The results show that *power distance* between teacher-student and *student collaboration* appear to be similar between the two cultural groups ($p>.01$). However, compared to the Flemish teachers, Chinese teachers put more emphasis on *competition* among students ($p<.001$).

Based on the interview data, we found that 14 out of 60 Chinese teachers stressed that they encourage competition among students. As one teacher stated, "our traditional *collectivism* is under the pressure of competition." Many Chinese teachers agreed that "collaboration among students is very important", however, some commented that "our educational system has been fostering competition all through primary and secondary education. How can students cooperate now?" A teacher who has implemented online learning said, "I support student collaboration. But the real implementation among students is not so good. Some students prefer to finish the assignments individually."

On the contrary, none of the Flemish teachers said they support competition among students. Most of them support student collaboration, as one teacher stressed, "collaboration is important, it help students understand the contents and principles". Regarding their perspectives on power distance, more Chinese teachers agree that students should accept what the teacher presents in class. However, after the class, Chinese teachers seem to have a closer "friendship" with the students. The latter seems to have mitigated the distance between Chinese teachers and students. One Chinese teacher put it in this way, "in knowledge transmission, teacher should play a central and leading role; in helping students develop as a person, teacher is also a friend." Flemish teachers, more often than the Chinese teachers, say that they do not impose their ideas on students and allow/encourage students to question them. "I work with students", one Flemish teacher said.

Teacher perspectives on teacher roles in higher education

The survey results show that Chinese teachers stress to a larger extent the teacher as an expert, an authority and a model as compared to Flemish teachers ($p < .01$). There are no significant differences in the perception of the teacher roles as a facilitator, or a delegator between the two cultural groups ($p > .01$). In both cultural settings, “elder” teachers ($> \text{Mean age}$) stress to a larger extent the expert and authority teacher roles ($p < .01$). There are no differences in age regarding the facilitator role. No significant differences are found between male and female teachers in both Chinese and Flemish teachers.

Table 5. Perception of teacher roles of Chinese and Flemish faculty

	Chinese faculty ^a	Flemish faculty ^b		
	<i>M</i> (σ)	<i>M</i> (σ)	<i>F</i>	<i>p</i> ^c
Teacher as an expert	4.10 (.39)	3.55 (.36)	31.65	<.000
Teacher as an authority	3.97 (.48)	3.44 (.49)	19.16	<.001
Teacher as a model	4.02 (.51)	3.56 (.47)	13.43	.003
Teacher as a facilitator	3.65 (.50)	3.63 (.49)	1.90	.45
Teacher as a delegator	3.52 (.44)	3.59 (.53)	1.97	.42

^a $n=60$; ^b $n=30$; ^c Adjustment for multiple comparisons: Bonferroni correction is applied.

The additional interview data are helpful to document these analysis results. More details were obtained as to how teachers understand these roles and what additional roles they play in different contexts. Authority and expert roles are important roles for Chinese teachers. According to them, “a teacher need be an authority in the knowledge domain”; “a teacher needs to be knowledgeable in his/her teaching subject”. As to the facilitator role and delegator roles, Chinese teachers support that a teacher should facilitate the learning process of students. This is similar to the perspective of their Flemish counterparts. However, there might exist some slightly different meanings between Chinese and Flemish teachers. For example, close to the facilitator role, many Chinese teachers refer to their role as a “guide”, who gives guidance and offers help to student during their learning process; while Flemish teachers quite often refer to their role as a “coach”, facilitating, supervising and helping students. Some Flemish teachers also referred to support students by meeting the different needs of individuals and groups. Additionally, Chinese teachers also stressed their role as a “friend” who gives students help and advice in view of their personal development and life.

Both Chinese and Flemish teachers stressed the adoption of different roles depending on the course objectives, student capabilities, class size, etc. However, we found that the teachers seem to view student capabilities differently. For example, many Chinese teachers mostly view the first and second year students not capable of independent thinking, thus teachers are more likely to play the ‘expert’ and ‘formal authority’ role; and they are more likely to adopt the role of a “facilitator” and “delegator” for advanced undergraduates and master students. This tendency was less obvious among the Flemish teachers. Possibly for this reason, we found that Flemish undergraduates are more often requested to work on cases, projects and papers compared to the Chinese undergraduates.

Teacher views on the social-constructivist approach to teaching and learning

In both the Chinese and Flemish contexts, teachers can be classified into three categories as to their views about the adoption of a social-constructivist approach to teaching and learning and the application of these principles in actual practices:

- Teachers supporting the social-constructivist principles and applying them in teaching practices in an extensive way;
- Teachers supporting the social-constructivist principles but applying them in teaching practices in a limited way;
- Teachers doubting the social-constructivist principles and as a consequence hardly applying them.

The majority (24 out of 30) of the Flemish teachers support the social-constructivist principles and say they apply them extensively in their teaching practice. Some teachers support the social-constructivist principles, but apply these in a limited way. Only one Flemish teacher doubted the relevance of the social-constructivist principles.

A small part (9 out of 60) of Chinese staff supports the social-constructivist principles and applies it extensively during teaching. About half of the Chinese teachers expressed agreement to the social-constructivist principles, but they apply them only in a limited way due to the feature of the class, the teaching subject, etc. The remaining proportion of staff stated they do not consciously consider these principles and are comfortable with their conventional lecture-based approach. A few of them expressed doubt about the social-constructivist approach.

Below we present some examples from the interview responses of the Chinese and Flemish teachers that reflect their understanding of social-

constructivist approach to teaching and learning and how they apply it in educational practices.

Talking about the social-constructivist principles, one Flemish teacher stated, *"I fully support it. I consciously pay attention to it when preparing the content of the course, and help students when needed... All knowledge is constructed; this includes personal construction and social construction."* As to the application of it, one Flemish teacher said, *"I leave them to read, explore, research, and work together"; "I give new directions and involve students in discussions"*. Other teachers expressed similar support, *"discussions can help students to understand that there is not just one solution, and bring to them more perspectives"; "peer cooperation is very important, students can construct knowledge from peer interaction"*. As to the practical restrictions that limit their actual application, one Flemish teacher put forth, *"I'm in favour of small group collaboration. But there are problems to invite students to discuss. Teacher should design, organize and synthesize the discussed topics."* Other teachers added, *"it is difficult to implement with more than 300 students"; "it is a demanding task to monitor all the discussions"*.

Among the Chinese teachers, a few of them expressed direct agreement to the construction of knowledge via social interaction, and about half of the respondents expressed agreement to collaborative learning modes, without directly referring to the social-constructivist principles. Despite the theoretical support, they expressed concerns as to the practical limitations in teaching practices. According to one Chinese teacher, *"the implementation of these principles in educational practices is rather limited; constructivism is mainly related to educational theories or policies; it is not widely supported in teaching practices"*. One of the main reasons for doubting social-constructivism put forward was: *"Undergraduate students, especially in their first two years, hardly master the knowledge base to be able to be involved in a social-constructivist approach to learning. It is therefore the teacher's responsibility to provide them with the knowledge base."* Another reason put forth by one teacher was, *"students can be wrong, teachers need to guide them"*.

Although the Flemish teachers did not seem to echo the same concern, both Flemish and Chinese teachers rendered the nature of the class such as large class size, teaching subjects, limited infrastructure (e.g. classroom layout), student interests and perceptions (e.g. towards group work) as restrictions for applying the principles in teaching practices. Compared to the Flemish counterparts, the Chinese teachers seem to face a bigger gap between their theoretical beliefs and teaching practices. Some of the constraints seem to be

related to the educational and cultural context, as some Chinese teachers mentioned, “*students are tied up with exams; some students do not like spending time to discuss things, they want to know the conclusion; they aim for high exam scores*”; “*some students think that discussion is not meaningful, it is a waste of time*”; “*they are used to work individually, due to the influences they got from primary and secondary schools*”; “*task based learning activities or discussions do not always interest them*”; therefore, “*when I face reluctance from students in participating in group activities such as discussions, I opt for the lecturing mode*”.

Additionally, differences were found between “younger” and “elder” teachers in the Chinese cohort. Younger teachers are more in favour of the social-constructivist learning principles. But there appears to be no linear relationship between teacher perceptions and teacher’s age. Nevertheless, we observe that teachers carrying objectivist assumptions and beliefs about teaching and learning are less willing to adopt a social-constructivist approach in their teaching practice. No differences were found between the “younger” and “elder” group in the Flemish cohort.

Adoption of online collaborative learning

Teachers can be classified into three categories as to their adoption of e-learning and online collaborative learning in blended learning environments:

- Teachers actually adopting online learning, including collaborative learning;
- Teachers adopting e-learning but not online collaborative group work;
- Teachers not adopting e-learning.

The number of e-learning adopters and non-adopters in both contexts is summarized in Table 6. In the Flemish context, Ghent University has implemented university-wide the Minerva e-learning system. Most teachers use this e-learning platform at least for course management and distribution of teaching materials. This results in a nearly full adoption of the e-learning environment by the interviewed Flemish staff. In addition, about one third of the staff also adopts online collaborative learning. The main reasons for the other staff not adopting online collaborative learning are related to lack of time and resources, lack of knowledge and experience on how to organize and monitor online group work.

In the Chinese context, an e-learning platform is available in both universities where we conducted this research. However, there is no university-wide implementation and its use is not required. Only about one

third of the interviewed Chinese staff uses the e-learning platform, among them only 5 teachers adopt online collaborative learning. A majority of the Chinese teachers has thus far not adopted e-learning.

The main reasons of non-adoption are illustrated below by quoting some teachers from each cultural context:

a. Lack of time and resources: *“It would take much time for updating and supervising student online collaborative work. I’m already overwhelmed by the existing workload. I don’t have teaching assistants.”* (A Flemish professor).

b. Practical constraints: *“The class size is too big, and the average (knowledge) level of students is very different.”* (A Flemish professor).

c. No experiences on how to organize and monitor student online work: *“There are professors who are more familiar with organizing and monitoring student online group work, but I am not very familiar with this.”* (A Flemish professor).

d. No need for innovation: *“The current teaching and learning methods are working very fine. I don’t see any need or incentive to adopt an online approach.”* (A Chinese professor)

e. Lack of institutional incentives: *“Investing more time in maintaining online learning and mentoring online group work are not included in teacher performance assessment. If the university or faculty requires teachers to do so, I will do it.”* (A Chinese professor)

f. Lack of technical skills and training: *“I am not good at using computers. I type slowly.”* (A Chinese professor)

g. Sceptical about online interaction and communication: *“I don’t trust computers, especially ‘online chat’. Students are often distracted online.”* (A Chinese professor)

“I don’t like to distribute lecture slides, so I would not put it online.” (A Chinese professor)

“I prefer face-to-face discussions than online discussions. It is more direct and the students get feedback immediately.” (A Chinese professor)

Table 6. The number of e-learning adopters and non-adopters among Chinese and Flemish faculty

	E-learning adopter			Total
	E-learning adopter without online collaboration	Online collaboration adopter	E-learning non-adopter	
Chinese faculty	15	5	40	60
Flemish faculty	21	8	1	30

Adoption of innovations: teacher and contextual variables

First of all, the correlation between cultural environment and the perceptions of teacher roles was analyzed (Table 7). The correlation analysis results show that teachers who perceive *power-distance between teachers and students* to a larger extent are more likely to take up the roles as an *expert* and an *authority*. Teachers who score higher on *student collaboration* perceive to a larger extent the roles as a facilitator and a delegator. The perception of *competition* is positively associated with the perceptions of the five roles. It seems to imply that no matter what type of roles the teacher takes, *competition* is very much present in the learning environment.

Furthermore, based on the interview data, several teacher and contextual variables are listed that are related to teachers' adoption of e-learning and online collaborative learning (Table 8). We found that teachers in favour of collaboration and the facilitator/delegator roles tend to be more willing to adopt the online collaborative learning approach. Teachers who are supportive of the social constructivist learning principle also tend to be more willing to adopt teaching innovations. It shows that teachers' perceptions on teaching and learning are critical to the adoption of online collaborative learning. Other teacher and contextual variables also emerged to be relevant. It is found that teachers who expressed a need or interest in innovation and willingness to learn are more willing to adopt e-learning and online collaborative approach. Teachers who use computers more frequently and are more familiar with computer/Internet technologies also expressed more interests in e-learning. Sound infrastructure, institutional incentives and relevant technical training are also considered important conditions for e-learning adoption.

Table 7. Correlation between the cultural environment and teacher roles of Chinese and Flemish staff

	expert	authority	model	facilitator	delegator
	<i>Pearson</i>	<i>Pearson</i>	<i>Pearson</i>	<i>Pearson</i>	<i>Pearson</i>
	<i>Correlation</i>	<i>Correlation</i>	<i>Correlation</i>	<i>Correlation</i>	<i>Correlation</i>
	(<i>R</i>)	(<i>R</i>)	(<i>R</i>)	(<i>R</i>)	(<i>R</i>)
Power distance	.312*	.418**	<i>ns</i>	<i>ns</i>	<i>ns</i>
teacher-student					
Collaboration	<i>ns</i> ^a	<i>ns</i>	<i>ns</i>	.435**	.582**
Competition	.440**	.464**	.481**	.554**	.342*

^a*ns* = non significant result

**, Correlation is significant at the 0.01 level.

*, Correlation is significant at the 0.05 level.

Table 8. Relationship between teacher and contextual variables and teachers' adoption of innovations in higher education

Teacher and contextual variables	innovation adoption	
	e-learning	online collaboration
Collaboration stressed in the learning environment		+
Teacher role as facilitator/ delegator		+
Supportive of social-constructivist learning principles		+
Perceived need of innovation	+	+
Perceptions of student centred learning and active learning		+
Willingness to learn and invest time	+	+
Computer competence	+	
Sound infrastructure	+	
Institutional impetus (policy, etc)	+	
Training and support	+	

+ represents a positive relationship between the factors.

Discussion and conclusion

This study examined Chinese and Flemish university staff perspectives on the cultural dimension in teaching and learning, their preferred teacher roles, their perceptions of social-constructivist principles and their adoption of e-learning and online collaborative learning. In general, specific differences and some similarities were observed between teachers in both cultural settings.

Cultural and institutional context

The findings suggest that social constructivism and the adoption of e-learning and online collaborative learning can be related to cultural differences. The results regarding student-teacher power distance seem to reveal no significant differences between the Chinese and Flemish context in teaching and learning. This seems to be not in line with the previous findings about Chinese culture that reflected a higher *power distance* compared to other low-context cultures (Hofstede & Bond, 1984). This can be due to the different research contexts and the evolution in time due to the modernization and globalization process. The questions in this study are more specifically targeting the teaching and learning environment, instead of the broader cultural and societal scope. Furthermore, teachers in the Chinese educational context combine an *authority* relationship with *friendship* to the students; this could have narrowed the perceived distance between teachers and students. The unique relationship could be labelled as a “hierarchical friendship” in the Chinese educational setting. The results seem to imply that the traditional cultural dimensions such as power distance, collectivism vs. individualism are not sufficient to differentiate teachers’ perspectives on the specific cultural environment related to teaching and learning. Other cultural and contextual factors should be pursued in order to identify the possible differences that influence teaching and learning, such as the current educational system, institutional environment and socio-economic influences. Additionally, our results show that *competition* among students is more promoted in China as compared to the Flemish educational setting. Competition is in our research the only differential cultural dimension between Chinese and Flemish teachers. Entry into higher education in China is quite competitive, which brings a series of requirements to the teachers and students. The competitive nature of education in the Chinese system often forces teachers and students to adopt more teacher-centred methods. Many Chinese universities are undergoing a reform process in order

to be better integrated in the international arena. However, there is still a long way to go to transform the actual teaching and learning practices.

The institutional environment also seems to influence teacher perspectives. Both teachers from the Flemish and Chinese universities report big challenges and pressure on research and teaching. In both settings, there is an evaluation system for academic staff. The Chinese teachers seem to be unhappier with the strictness and the evaluation approach of their institution. Therefore, many are rather unwilling to adopt any teaching innovation that is not included in the evaluation system. The learner-centred and social-constructivist learning approach has been more widely applied in the Flemish educational system. In the Flemish academic evaluation system, more emphasis is put on rewarding investments in educational activities and innovations.

Teacher roles in higher education

Our findings confirm previous claims that Chinese teachers are regarded as a model both of knowledge and morality (Jin & Cortazzi, 1998). The teacher's authoritative role is clearly emphasized in the Chinese context (Paine, 1990; Brick, 1991; Cortazzi & Jin, 1996). Nevertheless, the traditional teacher-student relationship is changing during recent years. In both cultural contexts, teachers consider it of importance to position themselves as "facilitators" or "delegators". In addition, Chinese teachers more often refer to their role as a "guide", who is more likely to play a guiding and leading role; whereas the "coach" role mentioned by the Flemish teachers refers to more of a supporting and supervising role.

The correlation results indicate a significant association between *competition* and the five specified teacher roles. This correlation could possibly indicate that no matter what kind of roles a teacher plays, the competition is very prominent in the Chinese educational environment. This could also imply that a teacher with a higher perception of competition is likely to play a variety of teacher roles or adopt different teaching approaches. This diversity of teacher roles has been found in the responses of many Chinese teachers.

Our results indicate that there are no significant differences between female and male teachers in their perceptions of teacher roles. This is not in line with previous findings that female teachers were less likely to play the expert and authority roles and more likely to play the facilitator and delegator roles than male teachers (Eagly & Karau, 1991). In fact, many teachers point out that they adopt different roles, depending on the teaching objectives, student background, etc. Nevertheless, each role demands that teachers have or

are willing to acquire the skills to adopt related instructional strategies. In addition, Chinese and Flemish teachers also seem to view the first and second year students differently. For the Chinese first and second years, Chinese teachers consider the transmission of knowledge to be very important, and thus it is the teacher's job to 'provide' and 'transmit' theories and basic knowledge to them. However, this is not the case in the Flemish setting.

Adoption of instructional innovations: teacher and contextual variables in higher education

In the Western educational settings, many initiatives to modernize education and to optimize student learning have been implemented. Both constructivism and social constructivism have inspired these innovations that aim at the acquisition of high-quality knowledge, the development of problem-solving skills, and the promotion of self-directed learning, etc. (Konings, Brand-Gruwel & van Merriënboer, 2005). In addition, many Western universities also promote the adoption of e-learning and online collaborative learning.

The current innovation of university education in China focuses on structural reform or system reform and the adaptation of educational objectives (Ma, 2005). The educational reform in China also drives university teaching to encourage students do more reflective thinking and active learning. This could explain that Chinese teachers think of the facilitator and delegator roles similarly important as the Flemish teachers. However, instructional innovations in universities are conducted in a limited way. The traditional way of teaching that emphasize the systematic knowledge transmission and teachers being authoritarian of the subjects they teach is still prevalent (Wang, 2006). This is especially related to teachers' teaching principles, the way how they were taught and their own learning behaviors (Gordona, Dembob & Hocevarb, 2007). Therefore, it is important for university teachers to articulate their theories and beliefs about teaching. In this respect, the literature clearly suggests that making teaching principles explicit is a necessary step before they can be critically evaluated by the teachers (Prebble et al. 2005, p. 60). When staff development programmes incorporate these articulation, reflection, and evaluation activities, they have the potential to transform teachers' conceptions about teaching and learning and related teaching practices.

Although e-learning platforms are available in both the Chinese and Flemish settings, the level of implementation is quite different. From the results, we see only about 8% of the Chinese faculty adopted online collaborative learning mode; however, 27% of the Flemish faculty adopted this

innovative mode. The general adoption of e-learning of the Flemish faculty reaches about 95%; however, the general adoption of e-learning is only about 30% among the Chinese faculty. Using Rogers (2003) model of five stages in the innovation-decision process as a reference, it is clear that Chinese and Flemish faculty are situated at a different stage. The majority of Chinese teachers can be positioned at the first stage ('knowledge' level), and only a very small proportion at the 'implementation' stage; while others are still at the pre-stage ('no knowledge' level). A large proportion of Flemish staff already functions at the 'knowledge' and 'implementation' stage. During the interview, we found that a few advanced teachers have reinforced the adoption of e-learning and online collaborative mode during the last decade in their career, thus have reached the 'confirmation' stage.

The results of this study suggest that there is an association between the support for the social-constructivist principles and emphasis on collaboration and the adoption of online collaborative learning. The teaching subject and class size are also considered as relevant factors. Faculty members teaching application-oriented or reality-related subjects were more active in their adoption of online collaborative learning as compared to staff teaching general introductory and theoretical courses. Teachers in smaller classes more often embrace group work as compared to teachers responsible for larger classes.

Nevertheless, in both settings, the potential of online collaborative learning is still relatively under-exploited. This is in line with the findings of Elgort (2005) who points out that despite the wide use of ICT in university teaching, e-learning adoption has not reached its full potential. Besides the practical constraints, such as resources and time, teachers' perceived need of innovation is an important factor. Teachers who do not experience a concrete necessity to look for an innovation, hold to old teaching habits. This conforms to the position of Rogers (2003) that one of the factors that influence the adoption of innovations is whether or not the innovation meets a perceived need. Teachers' attitude towards online communication is another influencing factor. Previous studies shed light on the benefits of online asynchronous communication as it offer time to present a more measured and considered view (Ramsay, 2005); however, these benefits were not recognized by all teachers. The results also echo previous finding that teachers who are eager to learn are more open for innovative teaching methods (van Eekelen, 2005). Our results present to policy makers and university administration some challenges for instructional innovations in higher education, among them adoption of new teaching principles, adapting teacher roles, stimulating need to innovate and providing institutional support are critical.

Implications and limitations

One strength of this study is that it enriches previous studies that teachers' perspectives on teaching principles and teacher roles are deeply rooted in specific cultural contexts (Gao & Watkins, 2002). More specifically, this study provides insights into the differences in higher education innovations that can be related to various cultural and contextual variables in China and Flanders. The results have clear practical implications to foster educational innovations, both in the Flemish and Chinese context. A critical list of factors - both at micro-level of the staff and at the meso-level of the university organization - affect a large scale adoption. At staff level, we have to stress teachers' perceptions of the need for an innovation, their perceptions of teaching and learning (social constructivist principles). At meso-level, we have to stress the institutional policy, technical readiness, the available infrastructure, etc. The mixed design of this study with both quantitative and qualitative methods brings a deeper understanding of Chinese and Flemish teacher perspectives and can be a good basis for future research.

Our study has a number of limitations. First, the number of teachers and universities involved in the research was limited. The results in this study could also be linked to the particular environment of the specific institutions. Future research should aim at involving more universities and more teachers in China and Flanders. Secondly, the use of same questionnaires in two distinct cultures could impose potential biases. Therefore, we need to be cautious when generalizing the results generated from the questionnaires. The interpretation of the results from the questionnaires needs to be combined with the qualitative findings. Thirdly, the current study focused especially on the teacher perspectives. Future research could attempt to focus on the institutional level. Tondeur, Valcke and van Braak (in press) found that the institutional level plays a critical role in innovation adoption at teacher level by applying a multilevel approach. Building on the results of the present study, a future study could apply such a multilevel approach to include the cultural and institutional context as additional theoretical and empirical dimensions. Only all these factors are taken into account, can a culturally appropriate teaching and learning takes place.

References

- Baron, J. (1998). Teaching on-line across cultures, in: A. Gooley, C. Pearson, S. Towers et al. (Eds) *Proceedings of the 3rd International Conference on Open Learning*, Brisbane, December (Brisbane, Queensland Open Learning Network), 67-72.
- Bauersfeld, H. (1995). The structuring of structures: Development and function of mathematizing as a social practice. In L. P. Steffe & J. Gale (Eds.), *Constructivism in education*, 137-158.
- Bednar, A.K., Cunningham, D., Duffy, T.M. & Perry, J.D. (1992). Theory in to Practice: How Do We Link? In T.M. Duffy & D.H. Jonassen (Eds.), *Constructivism and the Technology of Instruction: A Conversation* (pp. 17-34). Hillsdale, N.J.: Erlbaum.
- Berry, J. W., Poortinga, Y. H., Segall, M. H., & Dasen, P. R. (2002). *Cross-cultural psychology: Research and applications*. Cambridge: Cambridge University Press.
- Brick, J. (1991). *China: A Handbook in Intercultural Communication*. Sydney: Macquarie University.
- Cortazzi, M. (1990). Cultural and educational expectations in the language classroom. In B. Harrison (Ed.), *Culture and the language classroom* (pp. 54-65). Hong Kong: Modern English Publications and the British Council.
- Cortazzi, M., & Jin, L. (1996). Cultures of learning: Language classrooms in China. In H. Coleman (Ed.), *Society and the language classroom* (pp. 169-206). Cambridge: Cambridge University Press.
- Duffy, T. M., & Jonassen, D. H. (1992). Constructivism: New Implications for Instructional Technology. In T. M. Duffy & D. H. Jonassen (Eds.), *Constructivism and the Technology of Instruction: A Conversation* (pp. 1-16). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Eagly, A. H. & Karau, S. J. (1991). Gender and the emergence of leaders: A meta-analysis. *Journal of Personality and Social Psychology*, 60, 685-710.
- Elgort, I. (2005). *E-learning adoption: Bridging the chasm*. Retrieved 5 June 2008 from http://www.ascilite.org.au/conferences/brisbane05/blogs/proceedings/20_Elgort.pdf
- Ertmer, P. A., & Newby, T. J. (1993). Behaviorism, cognitivism, constructivism: Comparing critical features from an instructional design perspective. *Performance Improvement Quarterly*, 6(4), 50-72.

- Fisher, D. & Waldrup, B. (1999). Cultural Factors of Science Classroom Learning Environments, Teacher-Student Interactions and Student Outcomes. *Research in Science & Technological Education*, 17(1), 83-96.
- Gamoran, A., Secada, W. G., & Marrett, C. B. (1998). *The organizational context of teaching and learning: Changing theoretical perspectives*. Handbook of sociology of education.
- Gao, L., & Watkins, D. A. (2002). Conceptions of teaching held by school science teachers in P. R. China: Identification and cross-cultural comparisons. *International Journal of Science Education*, 24(1), 61-79.
- Gordona, S.C., Dembob, M. H. & Hocevarb, D. (2007). Do teachers' own learning behaviors influence their classroom goal orientation and control ideology? *Teaching and Teacher Education*, 23 (1), 36-46.
- Grasha, A. F. & Riechmann-Hruska, S. (1990). *Teaching Style Survey*, University of Cincinnati, Cincinnati, Oh 45221. Copyright 1976, 1987, 1990, 1996. Retrieved 3 January 2008 from <http://longleaf.net/teachingstyle.html>.
- Grasha, A.F. (1994). A matter of style: The teacher as expert, formal authority, personal model, facilitator, and delegator. *College Teaching*, 42, 142-149.
- Harris, K.R. and Alexander, P.A. (1998). Integrated, constructivist education: Challenge and reality, *Educational Psychology Review* 10(2), 115-127.
- Hofstede, G. & Bond, M. H. (1984). Hofstede's culture dimensions: an independent validation using Rokeach's Value Survey, *Journal of Cross-Cultural Psychology*, 15, 417-433.
- Hofstede, G. (1984). *Culture's Consequences*. Newbury Park, CA: Sage Publications.
- Hofstede, G. (1986). Cultural Differences in Teaching and Learning. *International Journal of Intercultural Relations*, 10, 301-320.
- Jegede, O. J. & Okebukola, P. A. (1988). An educology of socio-cultural factors in science classrooms. *International Journal of Educology*, 2(2): 93-107. Jegede, O. J. & P. A. Okebukola, 1990. Development and Validation of an Instrument to Measure the Socio-Cultural Environment in Science Classrooms. Annual Meeting of the American Educational Research Association, Boston, MA.
- Jin, L. & Cortazzi, M. (1998). Dimensions of Dialogue: large classes in China, *International Journal of Educational Research*, 29, 739-761.
- Jonassen, D., Davidson, M., Collins, M., Campbell, J. & Haag, B. (1995). Constructivism and computer-mediated communication. *American journal of distance education*, 9(2), 7-25.

- Kember, D. (1997). A reconceptualisation of the research into university academics' conceptions of teaching. *Learning and Instruction*, 7 (3), 255-275.
- Kirschner, P.A. & Paas, F. (2001). Web enhanced higher education: A tower of Babel, *Computers in Human Behavior*, 17 (4), 347-353.
- Könings, K.D., Brand-Gruwel S. & van Merriënboer J.J.G. (2005). Towards more powerful learning environments through combining the perspectives of designers, teachers and students, *British Journal of Educational Psychology*, 75 (4), 645-660.
- Könings, K.D., Brand-Gruwela, S. & van Merriënboera, J.J.G. (2007). Teachers' perspectives on innovations: Implications for educational design. *Teaching and Teacher Education*, 23 (6), 985-997.
- Löfström, E. & Nevgi, A. (2007). From strategic planning to meaningful learning: diverse perspectives on the development of web-based teaching and learning in higher education. *British Journal of Educational Technology*, 38(2), 312-324.
- Ma. C. (2005). Some Ideas on System Reform and Innovation in China's Higher Education. *Science Education in Higher Education*, 2. Retrieved 19 August 2008 from <http://scholar.ilib.cn/A-gdlkly200502010.html>
- Martin, E. & Ramsden, P. (1994). *Effectiveness and Efficiency of Courses in Teaching Methods for Recently Appointed Academic Staff*. Canberra, ACT, Australian Government Publishing Service
- McClure, J. W. (2003). *The experiences of Chinese international postgraduates studying in Singapore*. Unpublished thesis of Doctor of Education, Griffith University.
- McMahon, M. (1997). Social Constructivism and the World Wide Web - A Paradigm for Learning. Paper presented at the ASCILITE conference. Perth, Australia, December 1997.
- Moos, R.H. (1979). *Evaluating educational environments: procedures, measures, findings and policy implications*. San Francisco: Jossey-Bass.
- Okebukola, P.A. (1986). The problem of large classes in science: An experiment in co-operative learning. *European Journal of Science Education*, 8 (1), 73-77.
- Paine, L. (1990). The teacher as virtuoso: A Chinese model for teaching. *Teachers College Record*, 92 (1), 49-81.
- Pratt, D. D., Kelly, M., & Wong, W. S. S. (1999). Chinese conceptions of 'effective teaching' in Hong Kong: Towards culturally sensitive evaluation of teaching. *International Journal of Lifelong Education*, 18(4), 241-258.
- Prebble, T., Hargraves, H., Leach, L., Naidoo, K., Suddaby, G., & Zepke, N. (2005). *Impact of student support services and academic development*

- programmes on student outcomes in undergraduate tertiary study: A synthesis of the research*. New Zealand: Ministry of Education. Retrieved from <http://www.minedu.govt.nz/goto/UgradStudOutcomesRpt>.
- Ramsay, G. (2005). Computer-mediated Communication and Culture: a comparison of 'Confucian-heritage' and 'Western' learner attitudes to asynchronous e-discussions undertaken in an Australian higher educational setting. *E-Learning*, 2 (3), 263-275.
- Ramsden, P. (2003). *Learning to Teach in Higher Education* (2nd ed). London, UK: Routledge Farmer.
- Robertson, I. (2004). Teachers at the interface: A model of implementation. Paper presented at the AARE conference, Melbourne. Retrieved 3 August 2008 from <http://www.aare.edu.au/04pap/rob04192.pdf>
- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York: The Free Press
- Ryan, J. (2000). *A guide to teaching international students*. Oxford: Oxford Centre for Staff and Learning Development.
- Schellens, T. & Valcke, M. (2005). Collaborative learning in asynchronous discussion groups: What about the impact on cognitive processing? *Computers in Human Behavior*, 21, 957 – 975.
- Simplicio, J.S.C. (2004). Today's teachers struggle to educate a generation of students unlike any that has ever been seen before, *Journal of Instructional Psychology*, 31 (1), 71–75.
- Slavin, R.E. (1996). Research on cooperative learning and achievement. *Contemporary Educational Psychology*, 21 (1), 43-69.
- Stacey, E. (1999). Collaborative learning in an online environment. *Journal of Distance Education*, 14 (2), 14-33.
- Tigelaar, D., Dolmans, D., Wolfhagen, I. & van der Vleuten, C. (2004). The development and validation of a framework for teaching competencies in higher education. *Higher Education*, 48 (2), 253-268.
- Tondeur, J., Valcke, M. & van Braak, J. (in press). A multidimensional approach to determinants of computer use in primary education: teacher and school characteristics. *Journal of Computer Assisted Learning*.
- Triandis, H.C., McCusker, C., & Hui, C.H. (1990). Multimethod probes of individualism and collectivism. *Journal of Personality and Social Psychology*. 59(5). 1006-1020.
- Trigwell, K.P.M. & Taylor, P. (1994). Qualitative differences in approaches to teaching first year university science, *Higher Education*, 27, 75–84.

- Valcke, M., Sang, G., Rots, I., & Hermans, R. (in press). Taking prospective teachers' beliefs into account in teacher education. In E. Baker, B. McGaw, and P. Peterson (Eds.), *International Encyclopedia of Education*, Third Edition, Oxford: Elsevier Ltd.
- Van Eekelen, I. M. (2005). Teachers' will and way to learn: Studies on how teachers learn and their willingness to do so. Unpublished doctoral dissertation, Maastricht University, The Netherlands.
- Wan, G. 2001. The learning experience of Chinese students in American universities: A cross-cultural perspective. *College Student Journal*, 35(1), 28-44.
- Wang, L. (2004). The Impact of Cultural Factors in an Online Learning Environment in Hong Kong. *HERDSA 2004 Conference*, 4-7 July 2004, Curtin University of Technology Sarawak Campus, Miri, Sarawak, Malaysia.
- Wang, T. (2006). Understanding Chinese culture and learning. *The Australian Educational Researcher*, Retrieved 3 August 2008 from <http://www.aare.edu.au/06pap/wan06122.pdf>
- Wang, J., & Mao, S. (1996). Culture and the kindergarten curriculum in the People's Republic of China. *Early Child Development and Care*, 123, 143-156.
- Zemsky, R., & Massy, W. (2004). *Thwarted innovation: What happened to e-learning and why*. The Learning Alliance at the University of Pennsylvania. Retrieved from <http://www.irhe.upenn.edu/WeatherStation.html>.

Chapter 8

General discussion and conclusion *

Abstract

The final chapter summarizes the main findings corresponding to the research questions. Results from the different chapters are interlinked and discussed in an integrated manner. Limitations of the studies are pointed out. Directions for future research and recommendations for educational policy makers, teachers and e-learning developers are proposed.

Answers to the general research question

The following general research question guided the research set up in the context of this dissertation: What is the impact of implementing an e-learning environment in two different cultural contexts, and how is this related to student variables and teacher perspectives?

In order to study the general research question, we conducted six empirical studies, by adopting three perspectives: the learner, the e-learning environment, and the teacher. First, do learners differ in their learning characteristics when studying in the e-learning environment? Secondly, when a similar e-learning design is implemented in two different cultural contexts, do students react and perform differently? Thirdly, how are teacher perspectives related to their adoption of e-learning, with a special emphasis on online collaborative learning? To look for answers to the research questions, three survey and interview (qualitative and quantitative) studies and three e-learning intervention studies were designed and implemented.

In general, the results confirm that both student variables and teacher variables are closely related to the successful implementation of e-learning. Specific differences and some similarities have been detected between the Chinese and Flemish group. Also within individual differences were identified in the cultural groups. Both cultural and other individual differences account for the diversity of students and teachers in the teaching and learning environment.

* Part of this chapter is based on Zhu, C. (2008). E-learning, constructivism and knowledge building. *Educational Technology*. 48 (6), p.p. 29-31.

In the following sections, we discuss the main research results in line with the different research questions.

Summary of studies and the main results

The six studies, reported in this dissertation, can be clustered corresponding to the three research perspectives presented in Chapter 1. Perspective 1 is represented with study 1 and 2 and focused on student variables related to learning. Perspective 2 is studied with study 3, 4 and 5, and centred on the implementation of an e-learning environment in two cultural settings. At the same time student perceptions, student motivation, satisfaction and their online performance and academic achievement were studied. Perspective 3 is represented in study 6 that focuses on teacher perspectives on their teacher roles and their adoption of specific learning principles and how this is related to their adoption of e-learning.

The six studies were set up in a consecutive way. This implies that we were able to take into account the findings of earlier studies when developing the next research. For example, in the first survey study it was found that the knowledge domain is an important factor affecting student adoption of learning approaches. In the following studies, we therefore decided to implement the educational intervention in the same knowledge domain to be able to come to more decisive conclusions. In study 3, motivation and learning strategies were identified as important factors influencing the online performance of the Chinese participants. Therefore, these variables were also included in study 4 when carrying out the cross-cultural comparative analysis. Based on the results of study 1, 2, 3 and 4, variables and scales found to be of relevance were selected as critical student variables to analyze the impact of student characteristics on online performance. In study 3 and 5, teacher interaction with students was found to be a critical factor affecting student satisfaction in e-learning. Therefore, teacher-student interaction model (teacher role) was central when studying the teacher perspective in study 6.

As introduced in Chapter 1, fifteen research questions were tackled in the studies. In this section, we will integrate and summarize the main results corresponding to the three research perspectives and the specific research questions.

Perspective 1: Student variables and learning in an e-learning context

The results were based on two survey studies, involving more than 300 students in each sub-sample. Five research questions were addressed in this part.

(RQ1) Similarities and differences were found between Chinese and Flemish students with regard to their conceptions of learning and approaches to learning. Compared to Flemish students, Chinese students reflect to a greater extent a conceptions of learning as “understanding”, “personal change” and “social competence”. No significant differences were found regarding the conception of learning as “remembering” between Chinese and Flemish students. The results also indicate that Chinese students did not reflect to a larger extent a surface approach to learning as compared to Flemish students, and that Chinese students adopted a deep approach to learning in a similar way as Flemish students. The two groups of students reflected – overall - a similar pattern in their learning approaches. Student adoption of learning approaches seems to be dependent on the requirements of the subject matter.

(RQ2) Similar correlations between learning conceptions and approaches to learning were identified in both cultural groups. However, also some clear differences were identified. For example, the conception learning as “remembering” is positively correlated to surface approaches to learning in Flemish students, but this is not the case in Chinese students.

(RQ3) Significant interaction effects were found between culture and the knowledge domain being studied on learning conceptions and approaches to learning. This suggests that there are variances in student characteristics depending on the knowledge domains being studied as well as the cultural context. As a result, the Chinese sample students in our study did not appear to be surface or rote learners. Our research results indicate that we cannot stereotype a student group based on a single factor. A variety of factors need to be considered when studying the impact of student characteristics and when designing learning environments that are expected to be suitable for different cultural settings. Detailed results were described in Chapter 2.

(RQ4) A theoretical structural model, describing the relationship between epistemological beliefs, learning conceptions and approaches to learning was tested, involving students of both cultural groups. The satisfactory fit indices indicate that epistemological beliefs predict conceptions of learning, which in turn are related to approaches to learning. The results indicate that a focus on fostering student sophisticated beliefs such as “dynamic knowledge” instead of “certain knowledge”, and “efforts” instead of “fixed ability” would be helpful for students to develop deep levels of learning conceptions and study approaches.

(RQ5) The structural model, tested in relation to RQ4, was tested while considering both cultural groups. Though the model seemed to fit both samples, clear differences could be found. The structural means and covariances were

different between the two groups. For example, we noticed a stronger covariance between the beliefs in “certain knowledge” and “fixed ability” in the Flemish sample. Detailed results were described in Chapter 3.

Perspective 2: E-learning implementation: e-learning features and student learning

An e-learning environment was implemented in the two different cultural settings. Seven research questions were addressed in line with this perspective. The implementation was set up in three phases. In a first phase, the e-learning course on “Instructional Sciences” was implemented for a group of Chinese students from Beijing Normal University based on the design of an e-learning course in the Flemish context. This study involved 90 first-year students enrolled for the educational sciences programme. The e-learning course with a strong emphasis on online group assignments was a formal part of the course, next to the traditional face-to-face sessions. Student perceptions and preferences with regard to specific characteristics of the e-learning environment (group discussion, peer learning, critical thinking, problem-based learning, interaction and help) were measured during a one semester e-learning implementation and contrasted with the perceptions in relation to a conventional face-to-face learning environment. On the base of this first phase, two research questions were tackled and reported in Chapter 4.

(RQ6) The results reveal that students reported less positive perceptions about studying in the e-learning environment, as compared to their perceptions about a conventional learning environment. However, their preferences for peer learning, critical thinking and problem-based learning clearly increased due to actual experiences with an e-learning environment.

(RQ7) Student motivational orientations, learning strategies and computer competence were found to be significantly related to student performance in online group discussions.

Based on the results of this study, a second phase of the educational intervention was designed, involving both Chinese and Flemish learners. During the second intervention phase, specific attention was paid to be able to control the parallel design of the e-learning setting in both cultural contexts; for example, adopting the same learning content and teaching strategies, assigning the same discussion tasks and putting forward the same guidelines in view of tutor support. Participants in the study consisted of the complete first year population studying educational sciences in both cultural settings. The research was set up in an ecological valid setting. Also their average age level and proportion of boys/girls were similar.

(RQ8) The results show that Flemish students perceive the collaborative e-learning environment in a more positive way as compared to the Chinese student group.

(RQ9) Chinese students showed a positive shift in their motivation and learning strategies such as critical thinking, elaboration and peer learning after the actual online collaborative learning experience. No such specific or comparable significant shifts were detected in the Flemish student group. More specific results were reported in Chapter 5.

In the third phase of the implementation of the educational intervention, parallel e-learning systems and online collaborative learning activities were implemented for both the Chinese and Flemish students. In these studies we also focused on student satisfaction and the nature of their learning process.

(RQ10) The results indicate that there were significant differences between Chinese and Flemish students regarding their satisfaction and dissatisfaction with the online collaborative learning approach. Flemish students stressed that the biggest advantage of e-learning was that they could work at their own pace and time, while most Chinese students especially appreciated the online group work format, which was new and exciting to them. What the Flemish students most disliked was the time-consuming nature of the collaborative learning activities. The largest problem, reported by the Chinese group was the lack of face-to-face interaction between student and teacher. In general, Flemish students spent more time on the online group work and were more satisfied with their assignment result. The third intervention study was reported in Chapter 6.

(RQ11) At content level, the types of messages posted by both groups were rather similar, with a majority of task oriented messages. The results also show that comparable levels of knowledge construction can be observed in the online discussions in both groups. The majority of messages were related to the first three levels of knowledge construction, while a minority of the messages could be positioned at the fourth or fifth levels of knowledge construction.

(RQ12) The results show that student epistemological beliefs, their conceptions of learning, their approaches to study, and their learning strategies were critical factors that could be related to student online performance and final academic achievement. Student perceptions of the online collaborative learning environment were also positively associated with their online performance. Furthermore, student satisfaction with the e-learning environment was positively related to performance in online group work. An interaction effect between culture and student preferences was found. For

example, the impact of preferences for collaborative learning on online performance was significant for the Flemish students, but not significant for the Chinese students. In the Chinese context, the participants in the collaborative condition outperformed students in the individual condition. Flemish students, in the collaborative condition, performed slightly better than Chinese students in the comparable condition.

Respective 3: Teacher variables related to the adoption of e-learning

Three main research questions were addressed in the final study.

(RQ13) The results show that Chinese teachers perceived to a larger extent that they should adopt the role of an expert and an authority as compared to their Flemish counterparts. Teacher perceptions about power distance and collaboration seem to be similar in both cultural groups. However, competition seems to be more prominent in the Chinese educational context than in the Flemish context.

(RQ14) Compared to the Flemish teachers, Chinese teachers position themselves more as an “expert”, “authority” and a “model”. No significant differences in the role as a “facilitator” and “delegator” were observed. A majority of Flemish university teachers accept and actively adopt the social constructivist principles. In contrast, only a small proportion of Chinese teachers accepts and adopts these principles. The majority of Flemish staff has implemented e-learning approaches, whereas this is still at an early stage for Chinese faculty members. The overall adoption of online collaborative learning is still quite limited in both settings, and even more so in the Chinese setting.

(RQ15) The results indicate that the adoption of innovation in higher education is related to the specific cultural-educational environment, the perceptions of teacher roles and the teaching principles adhered to. Teachers adopting the role of a facilitator and delegator are more likely to adopt online collaboration. Online collaboration is also more often promoted by teachers who support the social-constructivist learning principles. In addition, the perceived need for an innovation, the teachers’ willingness to learn and invest time, the institutional incentives and support in view of innovations, and practical considerations are also important factors that play a decisive role in the adoption of the educational innovation.

General discussion

Student characteristics related to learning: cultural and individual differences and malleability

The current study enriches the available literature regarding student epistemological beliefs, learning conceptions and approaches to learning, and especially the literature in the field of cultural comparative studies. The results indicate that student learning conceptions and approaches to learning are influenced by both the cultural and the specific learning context. The findings indicate that we cannot stereotype a student group on the base of a single factor, such as their cultural background. In other words, this suggests that it is not possible to talk about “the” Chinese student. Different factors need to be considered when comparing student characteristics and in view of designing suitable learning environments that fit specific cultural settings. This adds to the argument of Pillay, Purdie & Boulton-Lewis (2000) that investigations of how students are influenced by both the cultural and the learning contexts provide a sound basis for the formulation of teaching and learning practices.

Testing the theoretical model regarding epistemological beliefs and learning resulted in adequate goodness-of-fit indices with the observed data. The model identifies specific relationships between epistemological beliefs, learning conceptions and approaches to study. These positive results contribute to the development of empirically tested models about student learning in higher education. The model stresses that attention should be paid to student epistemological beliefs in order to foster deep level learning approaches. The results also indicate that strengthening student conceptions of understanding and personal change and ‘weakening’ their beliefs about the *certainly of knowledge* and *fixed ability to learn* could be helpful to foster student adoption of deep approaches to learning. Comparing the fitness of the structural equation model between the two distinct cultural groups helped us to detect similarities and disparities in patterns in the model of student learning in both cultural contexts.

The results provide support to the idea that there is a transactional concern between epistemological beliefs and instruction (Windschitl & Andre, 1998). On the one hand, students who hold more advanced epistemological beliefs are more in favour of a social-constructivist learning design; on the other hand, applying a student-centred constructivist learning approach can also be helpful the epistemological development of students.

The findings seem to support the assertion of Atherton (2003) that the design of the learning environment also encourages students to adopt the

particular learning approach mirrored in the environment. “Context” is a key component both for the learning that takes place and for the learner themselves (Kelly, 2000). Educators should on the one hand design instructional methods that are suitable for students and on the other hand also attempt to orient and influence student beliefs, learning conceptions and strategies through a constructivist-oriented instructional approach.

The results also echo previous findings that students reflect a dominant preference for the strategic approach to learning (Schellens & Valcke, 2000). This could be related to the fact that in both settings, many students already have developed this type of learning approaches during their secondary education. Student adoption of learning approaches is also dependent on the learning context, such as the different requirements of the subject matter. This explains why in the consecutive studies, students and teachers in the same knowledge domain were involved in the research design. Furthermore, the features of the learning environment should also be considered when discussing student learning characteristics. This also justifies the research focusing on the effects of the educational interventions on student perceptions and motivations, and the study about the teacher perspectives as an important factor in the learning environment.

Important to note is that student learning characteristics should be considered as “states”, not “traits”, since these characteristics can evolve as a result of actual work in and experience with different learning environments. Zhang and Sternberg (2005) stress in this context the malleability of “intellectual styles”, be it learning styles or teaching styles. Our results confirm that student learning strategies can evolve, considering the different requirements of the learning environment. The results of this research also show that we cannot stereotype student populations. Three studies (reported in Chapter 2, 3 and 6) provide evidence that memorization and surface learning is for instance not a specific characteristic of Chinese students. Also the Flemish students seem to adopt memorization, due to the large workload, etc. as explained in Chapter 2.

Understanding student differences, as they interact with a certain educational context and with a specific cultural context, seems to be of importance for the educational design of instructional interventions. Despite the malleability of student learning characteristics, available empirical evidence indicates that students from different cultures tend to reflect different learning characteristics as a result of their different cultural context (Woodrow, 2001). Our results confirm that there are differences in learning conceptions and preferences between Chinese and Flemish students. However, cross-

cultural differences in learning characteristics do not restrict their malleability in a long term. Students adapt their learning approaches to the task demands and to the demands of the learning contexts.

Cross-cultural e-learning implementation: e-learning characteristics and student learning experience

The results of the invention studies show that on the one hand, the Chinese students appreciate the “new” learning format, but on the other hand, their perceptions of the e-learning environment are less positive as compared to their perceptions of the conventional learning environment. This can be related to the “innovative” set-up and the impact of cultural variables. Our findings confirm previous research that students experience problems when an “innovative” learning format is set up (Gijbels et al., 2006). As to the cultural influences, this can be related to expectations about teacher involvement. The teacher or the tutor plays a very important role in the Chinese educational context. Online collaboration seems to be experienced as less meaningful if there is no “authoritative” voice available or present. Secondly, expressing disagreement is less likely observed in Chinese students as compared to Flemish students. This can be related to the respect for group “harmony” in the Chinese culture. Chinese students are reluctant to speak out their personal ideas either for fear of being thought silly or for fear of making others feeling humiliated. Volet (1999) also found that Confucian-Heritage Chinese learners generally participate to a lower extent in discussions. CHC learners’ main goal is to maintain group harmony, and this affects the nature of their group interaction (Jones, 1999). Therefore, the Western approach of working in groups and dealing with conflict may seem to be – initially - inappropriate from a cultural point of view.

The less positive perceptions of the e-learning environment by the Chinese students can also be due to the implementation of the e-learning approach on the base of an existing Flemish course in the Chinese context. The results imply that cultural variables, such as face, authority and harmony, had an influence on student participation and appreciation of the online collaborative learning format.

The evolution of Chinese students’ motivation and learning strategies into a direction that is expected in the particular e-learning setting, suggests the potential of task-based collaborative learning approach to foster critical thinking and peer learning in these Chinese students. The findings also suggest that a future e-learning implementation will be required to provide more structure and guidance for students in online group activities. The design of the

particular task assignment is also important. It has been argued that Chinese students need activities that are culturally tailored to avoid embarrassment of individual students (Dunn & Wallace, 2004).

Furthermore, the educational intervention was implemented in the Chinese context for a relatively short period of time. This might have affected student perceptions of the e-learning environment, especially when the other courses in the curriculum were still set up according to the conventional format. When the present studies were set up, only a small number of the courses in the curriculum reflected an e-learning format or required ICT support. Chinese students found it less convenient to spend extra time to be involved in the online discussion since they had to go to a separate PC room and sometimes had problems to connect to the e-learning system. The results also points at the persistent influence of earlier and dominant experiences with instructional formats. We learn from this that fostering positive perceptions of a learning environment necessitates a more extensive and longer period of time during which students are able to become an experienced learner in the new setting.

Understanding student satisfaction with online collaborative learning is also helpful for the design of e-learning environments. Both cultural groups of students seemed to be satisfied with the functionalities of the e-learning environment and appreciated the opportunities to work collaboratively online. The results are consistent with previous studies that students in general are satisfied with online collaborative learning (Dewiyanti, Brand-Gruwel, Jochems & Broers, 2007). However, the Chinese students found that the lack of teacher guidance and interaction in the e-learning environment was a large problem. This might be related to the low ambiguity tolerance of Chinese students who expect the presence of an expert and prefer to approach knowledge as something that is “certain” (Zhu, Valcke & Schellens, 2008). The latter implies that these students require more feedback and teacher help in the learning environment (Anderson, 2000). This could also explain that most of the current e-learning programs in China tend to be heavily instructor-centred. Flemish students reported ‘time-consuming’ as a key problem, and student contributions among the group members were not equal. Due to the latter, we adopted an alternative assessment approach combining a group score and an individual score to determine the quality of individual contributions to group assignments.

Technical problems seem to have affected student satisfaction in both groups. Therefore, attention should be paid to the training of some basic technical skills in future set-ups, or to provide technical support to learners. In addition, access to an adequate infrastructure is a relevant factor. It was found

that the infrastructure is less advanced in the Chinese context as compared to the Flemish context. In the Flemish context, the e-learning system is easily accessible for all teachers and students; both on and off campus. In contrast, in the Chinese context, this was not the case.

When we analyse the actual collaboration activities and the nature of the messages, we could conclude that the majority of group communications was task-oriented in both cultural groups. Activities such as asking, arguing, explaining, and providing extra resources dominated the discussions. These findings are in line with previous studies about online collaborative learning (Schellens & Valcke, 2006). When we consider the knowledge construction levels attained by both Chinese and Flemish students, we observe that most messages reflect a knowledge processing level from level 1 to level 3. The large proportion of these three processing levels is consistent with previous findings that few messages can be labelled at the fourth and fifth level (Gunawardena et al., 1997; McLoughlin & Luca, 2002). This is not surprising since these studies were set up with students that are novices to the knowledge domain. It can hardly be expected that students entering a new knowledge domain reflect higher level cognitive processing activities. In Chinese students, we observed a smaller proportion of messages that express dissonance among group members. This might be due to the fact that Chinese students did not want to openly disagree with their group members.

The results indicate that promoting student deep learning conception, deep approaches to learning, and elaboration strategy is helpful to enhance student online performance as the group discussion requires students to actively seek information, analyze the problems and elaborate their views or interpretations. Teachers should also help students to comprehend the nature of knowledge and knowing in a sophisticated way, so students can find it meaningful to discuss theories, reconcile multiple theoretical perspectives, analyze problems, and thus value collaborative learning.

Teacher perspectives and variables related to the adoption of e-learning

The adoption of educational innovations is related to many factors, such as the specific cultural and educational environment, teachers' perspective about teacher roles, the adoption of teaching and learning principles, educational policies, and institutional support. In the context of comparisons between Western and eastern cultures, many authors refer to the individualistic/collectivistic dimension to explain differences (Hofstede, 1980; Leung & Bond, 1984; Schwartz, 1994; Triandis, 1995). Our study of teacher perspectives about the cultural dimensions in teaching and learning can be

considered as an attempt to “unpack” the individualistic/collectivistic dimensions. Collaboration is stressed by both Chinese and Flemish teachers, and both believe that collaborative learning is beneficial for student learning and the development of their social skills. Power distance in general seems to be similar but some differences could be observed between Flemish and Chinese staff members. In a tentative way, we would put forward “respected closeness” or “hierarchical friendship” to describe the position of Chinese teachers and students; and the label of “respected equality” to qualify Flemish teachers and students. The stronger emphasis on competition in the Chinese educational system seems to have a rather negative impact on student collaboration.

Although online collaborative learning has been promoted by many authors in the literature, our results show that teachers’ adoption of online collaboration in universities is still quite limited in both the Chinese and Flemish context, and certainly much less developed in the Chinese context. Furthermore, the “knowledge transmission” process reappears in the context of e-learning, in contrast to a constructivist approach. In this context, Jonassen (2008) states that instructional decisions are affected by beliefs (personal theories of learning and instruction) of actors involved in the context. It has, for example, been argued that educators who carrying constructivist or “objectivist” assumptions and beliefs will display different teaching practices (Jonassen, Davidson, Collins, Campbell, & Haag, 1995). Our observation about the re-entering of “knowledge transmission” approaches within the innovative learning environment is also in line with the observation of Reeves (2008) who expressed his concerns about ICT use in education. He states that most use is disappointing because implementations are driven primarily by a pedagogy of “instructivism”. Therefore, in view of a sound implementation of online collaboration and/or e-learning, the educators’ perspectives and beliefs should be looked into.

In a collaborative e-learning setting, learners can build up their knowledge through assimilating, creating and sharing information. Previous empirical studies indicate that an e-learning system supporting collaboration can foster the understanding of the learning content and help the learners to achieve a higher level of satisfaction and learning performance (Zhang, Zhou, Briggs & Nunamaker, 2006). Therefore, student interactions and student collaboration should be fostered in e-learning settings.

Regarding the teacher roles, teachers should ensure effective teaching and learning by expanding their repertoire of their teaching roles and adopting these roles in a flexible way. Teachers need to adopt various approaches to

teaching to involve students into an interactive instructional process. By embracing a wide range of teaching roles and by being flexible in their teaching, teachers can also accommodate learning preferences of the majority of students. This will not only accommodate students learning preferences, but also provide teachers an opportunity to challenge themselves to develop other teacher roles they normally would not adopt.

The educational reform in China also drives university teaching to encourage students do more reflective thinking and active learning (Ma, 2008). Social-constructivist learning is one of the guidelines that guided the higher education curriculum reform. This helps to explain why some Chinese teachers already accept the role of the teacher as a facilitator or delegator in a similar way as Flemish teachers. However, the traditional way of teaching that emphasize the systematic knowledge transmission and teachers being authoritarian of the subjects they teach is still prevalent (Wang, 2006). Our results reveal that some Chinese teachers also doubt the social-constructivist learning principles. It is therefore important that teachers come to understand that the adoption of social-constructivist learning principles does not reduce the teacher's role in the teaching and learning process. During the social interaction process, the teacher is still an important source for guiding and helping students to understand the subject they are learning. The latter does not imply that traditional lecture formats are no longer accepted. Lecturing can still be crucial to clarify complex informational ideas or to present learning material that is not readily available. By adopting a variety of instructional strategies, staff will be able to develop students that are more actively involved in the learning experience. Nevertheless, we have to return again to the underlying conceptions that are linked to teaching and learning. For example, the premise of collaborative learning is that consensus is built through collaboration. This is in contrast to a competition model that expects individuals to best other group members. It can be hypothesized that since the Chinese context highlights to a larger extent competition, the implementation of collaborative learning faces more challenges. However, we also have to note that in the Chinese context collaboration can be observed. This collaboration often takes place during informal moments (after class, in dormitories, etc.). This is in line with the results of previous studies that pointed out that Chinese students are rather used to informal peer support (Tang, 1996).

As to the adoption of educational innovations, we stress that teacher perspectives in teaching and learning principles are crucial. Only when a teacher's perceptions of teaching and learning principles are transformed, they

will feel a need to transform the current teaching methods or techniques and will be willing to invest time for educational innovations.

Previous research has clearly indicated that institutional policy and support plays a critical role in innovation adoption at teacher level (Tondeur, Valcke and van Braak, in press). Therefore, relevant institutional policies need to be established in order to support educational innovations in higher education.

Cultural and educational context

Individualism versus collectivism is one of the ways to operationalize cultural categories. However, our results seem to show that traditional cultural dimensions such as power distance, collectivism vs. individualism are not sufficient to differentiate teachers' perspectives on teaching and learning in Flanders and China. Other cultural and contextual factors should be operationalized to be able to identify the differences that influence teaching and learning, such as the current educational system, institutional environment and socio-economic influences.

As stated in Chapter 1, on the one hand, we adopt the notion of a dynamic and fluid nature of culture. On the other hand, we postulate that the theoretical division between individualism and collectivism tradition is useful, and is expected to impact people's daily behaviour. We acknowledge the notion that cultures are far too complex to be labelled on the base of a simple dichotomy. It is clearly more useful to conceptualize cultures as fluid hybrids operating along a continuum with individualism and collectivism at the poles.

In the Chinese educational context, the traditional collectivist disposition is countered in a learning environment due to the high level of competition. Chinese tradition values normally mutual help and support. Considering the lower level of participation of Chinese students in online collaboration, Phuong-Mai, Terlouw and Pilot (2005) argued that referring to collectivism is insufficient to explain the nature of group learning. Collectivism is no panaché for everything related to the adoption of group learning. The adoption is often dependent on the nature of the educational system; whether instructional and assessment practices encourage independent or collaborative forms of learning and collaboration. For example, it is often observed that when students are not expected to work together, they often tend to work independently. The latter is especially true when the educational system is generally based on rote learning, in which it is sufficient for students to adopt memorizing, without interpreting and without working in groups.

On the base of the work of Joseph Needham (1996), we can tackle the discussion of ways to foster of critical thinking in the Chinese cultural context.

Needham pointed out that emphasis on shared community thinking and a strong respect for elders, entails that children and also college students hardly question teachers. Also, the desire to maintain a strong cultural identity discourages new developments in favour of keeping the traditional way of doing things. However, considering the Chinese higher education context, tradition is also changing. The adoption of a more open and scientific way of thinking is but one indicator in this context (Hongladarom, 1998; Tian, 2008).

Openness and daring to think, in principle, is encouraged in the Flemish educational system and its culture. The Flemish teachers clearly stress the importance of collaborative learning and do not support competition among students. However, due to the open access of higher education, the first year education often practically acts as a screening for students. The rigid examination system in a way enhanced student strategic learning approach. Furthermore, student individual learning preferences are very diverse; some Flemish student learning ‘styles’ are not completely congruent with the requirements of the constructive and collaborative learning environment (Schellens, 2004).

Last but not least, we’d like to point out that the purpose of any cross-cultural studies is not to adopt an ethnocentric approach towards any of the cultural group being studied. Previous studies have advocated that a preferred educational model should be based on sound principles of learning which leads to “deep conceptual content” (Brown, 1994), “durable, flexible, functional, meaningful and application oriented” learning outcomes (Simons, 1997) and learning-enhancing affordances for all students. Relevant principles of learning such as social-constructivist based collaborative learning provide a sound basis for designing powerful learning environments in an international, multicultural perspective. Regardless of their cultural-educational backgrounds, all students need to be provided with opportunities to learn how to cognitively, motivationally, and emotionally self-scaffold their learning (Boekaerts, 1997) for independent as well as interdependent modes of participation (Salomon & Perkins, 1998). In the long term, active participation in authentic learning activities and mindful, shared regulation of learning may help students to decontextualize their knowledge about learning and develop metacognitive strategies, and to tackle culturally and educationally different learning situations.

Methodological remarks and controls of cultural comparative study

In this dissertation we went beyond simplistic cross-national comparisons and examined the processes, variability and degrees of interdependence within groups, and multi-variables that affected student learning and teacher adoption of innovation. Multiple methods have been applied in the studies, such as survey, interviews and content analysis. Both qualitative and quantitative analyses have been applied to triangulate the data gathered and the findings. Thus the concerns about the use of self-report rating scales in different cultures have not gone unheeded.

Quasi-experimental designs were used for the three intervention studies. Next to the quasi-experimental design, relationships between pre-post designs were also considered. By examining student characteristics at pre and post level, we also examined the similarity or differences of developmental patterns in cultural contexts.

Cross-cultural research about student learning is a complex process. As for the cultural dimensions, we examined three dimensions (power distance, collaboration and competition) that were expected to be specifically relevant for the teaching and learning environment. Some researchers (e.g. Gjerde, 2004) have argued that emphasis on individualism and collectivism dichotomy may fuel stereotypes and runs the risks of viewing culture as static. Bearing this in mind, in this research, we refer to the individualism and collectivism tradition as a point of departure for discussion, and applied empirical studies to test the assumptions.

Special attention has been paid to control the design of the cultural comparative studies. First, the cultural samples were selected based on the theoretical assumptions and the research objectives. Secondly, efforts have been made to guarantee the comparability of the research objects and the quasi-experimental settings. The third form of control was the elimination of effects by irrelevant variables through statistical analysis (e.g. by means of analysis of co-variance or regression techniques). A fourth type of control involved the use of more than one method of measurement. In this way, the findings were triangulated through different research methodologies. Schneider, French and Chen (2006) have argued that most cross-cultural research results from a collaboration between researchers from different countries to develop a shared knowledge base about the similarities and differences between cultures; this should not be dismissed as “convenience sampling”, but instead can be seen as a reflection to understand the features of a culture prior to undertaking research, thus avoiding an imposed etic approach.

As for the quantitative studies, a total of 10 different instruments have been used in the six conducted studies. For all the applied measurements, the validity and internal consistency was checked by applying confirmatory factor analysis and internal reliability analysis, involving both cultural samples.

One of the challenges for the research design and the implementation of cross-cultural studies is related to the theoretical constructs and the related instruments. The establishment of the comparability of the measurements is of key importance. First of all, it is important that the researcher is familiar with both the constructs in both cultural contexts. Second, careful attention should be paid to the translation/adaptation of the instruments, which has to be controlled with a couple of methods (van de Vijver & Leung, 1997). Research instruments are described as conceptually equivalent when they are similarly understood by individuals in each cultural setting. To assure conceptual equivalence, we have applied forward- and back-translation for all the instruments used. For the self-constructed questionnaires, pilot studies were conducted to check the appropriateness of the measures. For instruments already applied in various settings, confirmatory factor analyses and internal reliability analyses were applied. Regardless of the specific techniques, it is important to conduct psychometric examinations of the measures, such as internal consistencies, factor structure, and validation at the measurement and construct levels (Card & Little, 2006).

In order to achieve metric equivalence, confirmatory factor analysis or structural equation modelling techniques were applied. We also did apply multi-group confirmatory factor analysis to identify invariant measurement of constructs, and to conduct nested-model comparisons between the unconstrained and constrained models. If measurement invariance across cultures can reasonably be concluded, then the cultural groups can be compared in the latent constructs, because the constructs can be presumed to represent fundamentally similar phenomena in the cultures under investigation. Furthermore, we have always applied the effect size analyses when evaluating the mean-level differences (e.g. Cohen's *d* and partial eta squared).

As to the interpretation of the results, a couple of issues are important for the reader when reading or referring to the results of the studies:

- The intention was not to stereotype. The results are rather expected to help educators or educational policy makers to understand the differences in each cultural and educational context.
- We acknowledge that student samples in each cultural context are not "homogenous". However, each individual is influenced by the culture

where he or she situates, and reciprocally the characteristics of the group can be representative of its culture.

- Learner characteristics within a cultural context are prone to evolve especially when facing a new educational design or setting. Internationalization and cultural diffusion also plays a role.

Limitations of the studies and directions for future research

The studies presented in this dissertation need to be approached with a couple of limitations in mind.

As to the research design, a specific set of student variables and teacher variables have been applied as independent variables. We realize that the list of variables is not exhaustive as to the potential influences on learning and teaching in an e-learning environment. There are other variables that might have attributed to the variations in the dependent variables. As to the parallel e-learning design in the two cultural contexts, we acknowledge that the controlled measures are somewhat limited, although strategies have been applied to make the research setting as comparable as possible. There are other factors that could hardly be controlled for, such as the institutional environment. Therefore we cannot claim that data from different cultural contexts are equivalent except for the “culture” variable (Gudykunst, Ting-Toomey & Chua, 1988). As a method to tackle this limitation, student background information such as gender, age, originating from rural or urban areas (for the Chinese students) was gathered. However, some other factors, such as educational policy, assessment methods, and dominating teaching and learning methods in the educational setting were not considered. Therefore, future research should add or focus upon additional variables affecting teaching and learning in e-learning environments. We also recognize the limitation that some of the variables were measured on the base of self-report instruments. Qualitative methods have been applied in this research in order to triangulate part of the quantitative results, but not in view of all variables under study. Student satisfaction, online performance and final test scores were used as dependent variables in this research. These variables might not have been able to fully reflect the efficacy of the e-learning environment. Future research could also examine how a collaborative e-learning environment influences student development of generic skills such as written communication, problem solving, analytic skills, and teamwork, which are among the main goals of instructional design (Bennett et al., 1998).

As to the participants, concern can be raised about the samples involved in the present studies as they represented particular universities, in a particular

region/city within the cultural contexts. We cannot be sure about the extent to which our results from these participants can be considered to be representative for the entire population. Therefore, generalization of findings resulting from this research should be made in a cautious way. However, we point out that in view of research with an intervention design, it is common to select samples from one or a few universities. Given the diverse origins of students (e.g., from different Chinese regions), the samples selected are yet somewhat representative of university freshmen at least for the universities involved in our study. Additionally, we only examined first-year university students in this research. Therefore, the results cannot be readily generalized for students in other knowledge domains or other educational levels without additional research. Next, the studies were set up in an authentic instructional setting. Thus the research results might be very context-bound. As to the teacher participants, the number and the domain of teachers are also limited. Future studies could aim at involving more teachers from more universities.

As to the e-learning intervention, the implementation of the e-learning environment with online group discussions was part of the standard course design in the Flemish setting. The specific e-learning system is also widely used for other courses in the Flemish setting. However, in the Chinese setting, the e-learning environment was introduced as a very “new” component to curriculum, because no other courses had yet been implemented according to this new approach. This difference in the set-up might have caused uncontrolled differences between both settings and might have affected our findings. Furthermore, the duration of e-learning implementation may also influence student learning preferences. Future studies from a longitudinal perspective may be warranted.

As to the data analysis approach, some additional or alternative statistical analysis methodologies could have been applied. For example, in Chapter 4, a multivariate regression analysis could have been applied to enrich the results. Another drawback is related to the content analysis and analysis of the interview data. Limited content analysis techniques were applied. Future research could include more detailed and qualitative discourse analysis. In view of the levels of knowledge construction in online group discussions, other content analysis models may shed a different light on the levels of knowledge construction. As to the coding of the interview data, some coding misinterpretation could have occurred; though a sufficient level of inter-rater reliability was achieved. Furthermore, the quality of the interview data was not controlled through re-interviewing or a check of the interpretation by the interviewees.

As to the findings, we recognize that we have only partially addressed the complex issue of student e-learning and teacher adoption of e-learning in higher education in the two cultural contexts. Some of the research findings need to be corroborated by further research. Next to the variables studied, other independent variables might have contributed to the differences and similarities identified. We acknowledge that the findings identified cannot demonstrate that culture is the only cause for the differences. In future research, additional new variables can be introduced or focused in the study design to assess the amount of variance that can be explained across cultures. Additionally, the present research focused on students and faculty; the results show that there is a need in future studies to explore, for example, the perspectives of educational administrators, and institutional management variables/processes. It is suggested that a multilevel approach could be one of the approaches to cope with the methodological challenges of cross-cultural research (Fontaine, 2008). Such an endeavor would be very valuable in future studies. Given the cultural diffusion and dynamic development that can occur during internationalization processes, we admit that the findings of this research are applicable only for a certain period or at a certain point in time. One important aspect to acknowledge when examining “learning in context” is that neither learners nor contexts are homogeneous or static entities. We are fully aware that what has been reported in this research, especially the characteristics of Chinese and Flemish teachers and students can evolve in the – even very near - future. Future research can attempt to capture the influences of culture in student learning from a dynamic perspective, and based on a longitudinal design. Both learners and the learning contexts are inclined to a constant evolution in interaction with broader societal shift, internal policies, international exchanges, and the changing characteristics of student populations and the professional development of teachers.

Theoretical and practical implications of the research findings

At the theoretical level, the studies contributes to a better understanding of student and teacher variables that are related to teaching and learning in e-learning environment in higher education. The current research provides a valid approach to consider the influence of cultural differences in students and teachers in two different cultural settings. It also provides support for the assumption that individual differences within cultures should be considered in cross-cultural comparative studies. The results provide a clear understanding that cultural context is critical with regard to instructional design in different cultural contexts. A number of student and teacher variables have been

identified as critical factors related to teaching and learning in e-learning environment. These important variables provide a sound basis for future research in related domains and can be replicated in future studies. In addition, the operationalization of cultural variables in this research can provide a useful reference for future comparative cultural studies. Some variables that have not been widely recognized in other studies, such as competition, could be one of new focuses in future studies.

The current research contributes to cross-cultural studies in several ways, and especially in two areas: the identification of variance and invariance of student and teacher variables in two distinct cultural contexts; and the validation of theories and relational patterns across-cultural contexts. The present research offers a deeper understanding of the interplay between student characteristics and the design of e-learning environment from a cross-cultural perspective. The study on teacher variables enriches previous studies that teachers' perspectives on teaching principles and teacher roles are deeply rooted in specific cultural contexts (Gao & Watkins, 2002), and are closely related to the adoption of educational innovations. Furthermore, a critical list of factors, both at micro-level and at the meso-level, has been identified to be relevant to e-learning adoption.

At the practical level, the research provides useful practical implications not only about the effectiveness of a particular e-learning environment with a focus on online collaboration, but also the potential differential impact on students in different cultural settings. More specifically, this research helps to understand the differences and similarities between Chinese and Flemish students and teachers regarding e-learning experiences and the implementation in China and Flanders. The findings can help educators and researchers from the concerned cultural contexts to be better armed with knowledge about the specific cultural-related variables.

Student variables, such as epistemological beliefs, conceptions of learning, approaches to study, motivation, learning strategies, preferences for collaborative learning, and satisfaction with the e-learning environment are important variables that influence student learning, especially in a collaborative e-learning environment. Understanding these variables is now helpful for instructors to design meaningful educational activities to promote student knowledge construction and make learning more effective and appealing.

In particular, this research helps to better understand the characteristics of students and teachers in China and Flanders respectively, which can help policy maker, educators and practitioners to have a clearer view about teaching

and learning in the concerned cultural contexts and overcome problems that may occur during cross-cultural educational cooperation and e-learning implementation. The research is especially valid in order to deliver a culturally suitable instructional design and to determine appropriate interpersonal relations in the concerned learning environments. Through this research we realized that it is risky to implement an educational design from one cultural-educational context to another without considering student and teachers' perceptions and requirements, and characteristics of the educational system in the target context. Eventually, we hope that through a better understanding cross-cultural similarities and differences, this type of research can help to overcome the potential (negative) effects of cultural differences, and create satisfying and productive educational partnerships across cultures.

The mixed design of this research with multiple methodologies helped to develop a deeper understanding of variables studied and can be applied as a good basis for future research. Our cross-cultural journey appears to have led us to a set of methodological values and cultural values about how learners perceive, act and react. As researchers, we need to continue to conceptualize cultures in a complex and multifaceted way when contemplating future studies. As this process unfolds, researchers will surely continue to move beyond the limits of simple dimensional systems. We hope this research can lay a basis for future studies that can reflect greater attention on some of the methodological considerations that have not been fully considered in this research.

Last but not least, as a result of this research, an e-learning platform, the same e-learning system as applied at Ghent University, has been installed in Beijing and implemented in the curriculum at Beijing Normal University. A lot of practical experience has been gained during the implementation process. Based on the implementation and findings of this research, we can offer experiences and suggestions for future design and implementation of e-learning in the Chinese context in order to avoid pitfalls and optimize the advantages of e-learning; and more importantly, meeting the requirements and characteristics of the Chinese students and teachers.

Recommendations for university policy makers, teachers and e-learning designers

This research is helpful to define implications for future educational innovations in higher education. Before the implementation of an educational innovation, student and teacher needs, their perspectives on teaching and learning should be understood.

Furthermore, if an e-learning system is to be implemented institutional wide, the university policy makers, e-learning developers and teachers need to support the following:

- Make sure that all the students and teachers from the institution know about the e-learning system and can easily access it.
- Make sure that the information infrastructure is adequate to support the planned delivery system. It may be hard for students and the faculty if they constantly meet problems in Internet connection, or could not upload or download the needed information smoothly.
- International e-learning developers should understand the importance of the complex cultural context of the target learners.
- The educational strategies used via the e-learning system should be culturally appropriate.
- Teachers need to understand that the Internet does not make distance disappear, and should think of other ways to provide effective help to students in e-learning.
- Incentives are necessary for both faculty and students.

Final conclusion

The present dissertation focused on learner characteristics and teacher perspectives in relation to the implementation of an e-learning environment in a university setting. Some key variables were studied to unravel the variance and invariance of students and teachers in different cultural-educational contexts.

In summary, both similarities and differences were found between Chinese and Flemish students regarding their learning conceptions, perceptions of and satisfaction with online collaborative learning. Differences were also found between Chinese and Flemish teachers regarding their perspectives about teaching and learning principles and the adoption of e-learning and online collaboration. In the meantime, relationship between individual preferences and student performance was identified. As a result, both student individual

and cultural characteristics need to be considered when implementing e-learning courses across cultures. Educational policy makers and e-learning designers should bear in mind the constructivist pedagogical thinking and design collaborative processes that truly integrate and draw upon individual prior experience, cultures, competencies, and interests of students and teachers, and engage learners in interactive collaboration and shared knowledge building (Sorensen & Takle, 2002).

References

- Anderson, M. (2000). Individual Characteristics and Web-based Courses. In C. R. Wolfe (Ed.), *Learning and teaching on the World Wide Web* (pp. 47-73). San Diego: Academic Press.
- Boekaerts, M. (1997). Self-regulated learning: A new concept embraced by researchers, policy makers, educator, teachers and students. *Learning and Instruction*, 7, 161–186.
- Brown, A.L. (1994). The advancement of learning. *Educational Researcher*, 23(8), 4–12.
- Card, N. A., & Little, T. D. (2006). Analytic considerations in cross-cultural research on peer relations. (pp. 75-95). In X. Chen, D. C. French, & B. Schneider (Eds.), *Cultural dimensions of children's peer relations*. Cambridge University Press.
- Chan, G. & Watkins, D. (1994). Classroom environment and approaches to learning: an investigation of the actual and preferred perceptions of Hong Kong secondary school students. *Instructional Sciences*, 22, 233–246.
- Chen, X., French, D., & Schneider, B.H. (2006). *Cultural dimensions of children's peer relations*. Cambridge University Press.
- Dewiyanti, S., Brand-Gruwel, S., Jochems, W., & Broers, N. J. (2007). Students' experiences with collaborative learning in asynchronous computer-supported collaborative learning environments. *Computers in Human Behavior*, 23, 496-514.
- Dunn, L. & Wallace, M. (2004). Australian academics teaching in Singapore: striving for cultural empathy. *Innovations in Education and Teaching International*, 41 (3), 291 – 304.
- Fontaine, J.R. (2008). Traditional and multilevel approaches in cross-cultural research: an integration of methodological frameworks. (ed.) in van de Vijver, van Hemert & Poortinga *Multilevel analysis of individuals and cultures*. Lawrence Erlbaum Associates. New York /London.

- Gijbels, D., Van De Watering, G., Dochy, F., & Van Den Bossche, P. (2006). New learning environments and constructivism: The students' Perspective. *Instructional Science*, 34, 213–226.
- Gjerde, P. F. (2004). Culture, power, and experience: Toward a person-centered cultural psychology. *Human Development*, 47, 138–157.
- Gudykunst, W. B., & Ting-Toomey, S. & Chua, E. (1988). Culture and interpersonal communication. Newbury Park, CA: Sage.
- Gunawardena, C. N., Lowe, C. A., & Anderson, T. (1997). Analysis of a global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. *Journal of Educational Computing Research*, 17, 397–431.
- Hongladarom, S. (1998). Asian Philosophy and Critical Thinking: Divergence or Convergence? Paper presented at the Third APPEND Seminar on Philosophy Education for the Next Millennium, May 6-8 1998, Chulalongkorn University.
- Hofstede, G. (1980). *Culture's consequences*. Beverly Hills, CA: Sage.
- Jonassen, D. H. (2008). Instructional design as design problem-solving: An iterative process. *Educational Technology*, 48 (3), 21–26.
- Jonassen, D., Davidson, M., Collins, M., Campbell, J. & Haag, B. (1995). Constructivism and computer-mediated communication. *American journal of distance education*, 9(2), 7–25.
- Jones A (1999) The Asian learner: an overview of approaches to learning. Teaching and Learning Unit Faculty of Economics and Commerce. University of Melbourne.
- Leung, K. & Bond, M. (1984). The impact of collectivism on reward allocation. *Journal of Personality and Social Psychology*, 47 (4), 793–804.
- Ma, W. (2008). Globalization and Paradigm Change in Higher Education: The Experience of China, in Mason, M., Herschok P.D. & Hawkins, J. N. (2008) *Changing Education*, CERC Studies in Comparative Education, 163–181.
- Matthew Etherington (2008). E-Learning pedagogy in the Primary School Classroom: the McDonaldization of Education, *Australian Journal of Teacher Education*, 33 (5), 29–54.
- McLoughlin, C. & Luca, J. (2002) A learner-centred approach to developing team skills through web-based learning and assessment. *British Journal of Educational Technology*, 33 (5), 571–582.
- Park, C.C. (2002) Cross-cultural Differences in learning—styles of secondary English learners. *Bilingual Research Journal*, 26 (2), 213–29.

- Phuong-Mai, N., Terlouw, C. & Pilot, A. (2005). Cooperative learning vs Confucian heritage culture's collectivism: confrontation to reveal some cultural conflicts and mismatch, *Asia-Europe Journal*, 3, 403–419.
- Reeves, T. (1997). Evaluating what really matters in computer-based education. Retrieved June, 17 2008 from <http://www.educationau.edu.au/jahia/Jahia/home/cache/offonce/pid/179;jsessionid=73DD1F7533DEEC60CD83E51CE13FB7A3?print=1>
- Rogoff, B., & Angelillo, C. (2002). How can we study cultural aspects of human development? *Human Development*, 45, 211-226.
- Salili, F. (1996). Accepting personal responsibility for learning. In: Watkin D, Biggs J (eds). *The Chinese learners: cultural, psychological and contextual influences*. The Central Printing Press, CERC and ACER, Hong Kong, pp 86–105.
- Salomon, G., & Perkins, D. (1998). Individual and social aspects of learning. *Review of Research in Education*, 23, 1-24.
- Schellens, T. (2004). Studying in a blended learning environment: researching congruency between learning environment and student characteristics and the impact of CSCL on knowledge construction. Ph.D dissertation. Ghent University. Belgium.
- Schellens, T. & Valcke, M. (2000). Re-engineering conventional university education: Implications for students' learning styles. *Distance Education*, 21(2), 361-384.
- Schellens, T., & Valcke, M. (2006). Fostering knowledge construction in university students through asynchronous discussion groups. *Computers & Education*, 46, 349-370.
- Schwartz, S.H. (1994). Beyond individualism/collectivism: New cultural dimension of values. In: Kim, U., Triandis, H., Kagitcibasi, C., Chow, S. and Yoon, G. Editors, 1994. *Individualism and collectivism*. Sage, Thousand Oaks, CA, 85–122.
- Simons, P.R.J. (1997). From romanticism to practice in learning. *Lifelong learning in Europe*, 1, 8–15.
- Sorensen, E. K. & Takle, E. S. (2002). Collaborative knowledge building in Web-based learning: Assessing the quality of dialogue. *The International Journal on E-Learning*, 1(1), 28-32.
- Straub D, Loch K, Evaristo R, Karahanna E, Strite M. (2002). Toward a theory-based measurement of culture. *Journal of Global Information Management*, 10(1), 13-23.
- Sullivan PN (1996) Sociocultural influences on classroom interactional styles. *TESOL Journal*, 6(1):32–34.

- Tang, C. (1996). Collaborative learning: the latent dimension in Chinese Students' learning. In: Watkin D, Biggs J (eds) *The Chinese learners: cultural, psychological and contextual influences*. Comparative Education Research Centre, The University of Hong Kong, 183–204.
- Tian, J. (2008). About the development of scientific thinking. Retrieved November 6, 2008 from <http://www.sddx.gov.cn/001/001013/001013001/946277033194.htm>
- Tondeur, J., Valcke, M. & van Braak, J. (in press). A multidimensional approach to determinants of computer use in primary education: teacher and school characteristics. *Journal of Computer Assisted Learning*.
- Triandis, H.C. (1995). *Individualism and collectivism*. Boulder, CO: Westview.
- van de Vijver, F. J. R., & Leung, K. (1997). *Methods and data analysis for cross-cultural research*. Newbury Park, CA: Sage.
- Volet, S. (1999). Learning across cultures: appropriateness of knowledge transfer. *International Journal of Educational Research*, 31, 625-643.
- Wang, T. (2006). Understanding Chinese culture and learning. *The Australian Educational Researcher*, Retrieved 3 August 2008 from <http://www.aare.edu.au/06pap/wan06122.pdf>
- Woodrow, D. (2001). Cultural determination of curricula, theories and practices. *Pedagogy, Culture and Society*. 9(1), 5-27.
- Zhang, D., Zhou, L., Briggs, R. O. & Nunamaker, J. F. (2006). Instructional video in e-learning: Assessing the impact of interactive video on learning effectiveness. *Information & Management*, 43 (1), 15-27.
- Zhang, L. F., & Sternberg, R. J. (2005). A threefold model of intellectual styles. *Educational Psychology Review*, 17 (1) 1-53.
- Zhu, C., Valcke, M. & Schellens, T. (2008). The Relationship between epistemological beliefs, learning conceptions, and approaches to study: a cross-cultural structural model? *Asia Pacific Journal of Education*, 28 (4), 411-423.

Summary

E-learning in higher education: student and teacher variables in the Chinese and Flemish cultural context

Introduction. The research reported in this dissertation focuses on learner characteristics and teacher perspectives in relation to the implementation of an e-learning environment in higher education in the Chinese and the Flemish cultural context. Key variables are studied to unravel the nature of student and teacher perceptions and behaviour in both cultural contexts.

The cultural context. “Culture” is referred to as “the shared way of life of a group of people” (Berry, Poortinga, Segall & Dasen, 1992, p.1). In the dissertation we adopt the central term “cultural context” (Rogoff & Angelillo, 2002). This refers to the contexts that are affected by cultural variables. This is different in the Chinese and Flemish context. The Chinese context is expected to be influenced by the Confucian Heritage Cultures (CHC) (Watkins & Biggs, 2001). The Flemish context is expected to be influenced by a more individualist culture (Hofstede, 1986).

General research problem and research perspectives. The general research problem of the dissertation is: What is the impact of implementing an e-learning environment in two different cultural contexts, and how is this related to student variables and teacher perspectives? The research is set up by adopting three research perspectives: the perspective of the learner, the e-learning environment, and the teacher. The three perspectives are expected to be influenced by the specific cultural context.

Theoretical base. The theoretical base of the research builds on the social constructivist learning theories, and the conceptions related to Computer Supported Collaborative Learning (CSCL). These theoretical positions accept a strong sensitivity to the cultural context. This is reflected in the cross-cultural psychologist view that “we are what we are because of our culturally based learning” (Segall, Dasen, Berry & Poortinga, 1990). The impact of the cultural context is studied on the base of the collectivism-individualism framework, power distance and competition (Bond, 1996; Hofstede, 1986; Triandis, McCusker, & Hui, 1990). These frameworks helped to develop research questions and hypotheses to be tested. The first chapter of this dissertation introduces the general research problem, the theoretical background, and the overall research design of this dissertation.

The studies. Six empirical studies are reported in the dissertation. These studies can be clustered corresponding to the three research perspectives mentioned above. Perspective 1 is represented in study 1 and 2 and focuses on student variables related to learning. Perspective 2 is studied with study 3, 4 and 5, and centers on the implementation of an e-learning environment in two cultural settings. At the same time student perceptions, student motivation, satisfaction and their online performance and academic achievement are studied. Perspective 3 is represented in study 6 that focuses on particular teacher perspectives about their teacher roles and their adoption of learning principles and how this has affected their adoption of e-learning. Both quantitative and qualitative methods have been applied in the different studies.

Study 1 reported in Chapter 2 examined the relationship between the cultural context, knowledge domain, and student conceptions of learning and approaches to study. The Conceptions of Learning Inventory (COLI) and the Approaches and Study Skills Inventory for Students (ASSIST) were administered to 362 Chinese and 360 Flemish first-year university students in Educational Sciences and Communication Studies. Confirmatory factor analysis was applied to establish the validity of the research instruments in the Chinese and Flemish contexts. The results show that Chinese students reflected to a greater extent conceptions of learning that stress “understanding”, “personal change” and “development of social competence” as compared to Flemish students. No differences were found with regard to their conception of learning as “remembering”. Approaches to study seemed to be dependent on the learning context. Correlations between learning conceptions and approaches were identified, with some variations between the two groups. It appears that both cultural and learning contexts need to be considered to understand variables related to student learning. Chapter 2 has been published in *Learning and Individual Differences*.

Study 2 reported in Chapter 3 focused on the relationship between epistemological beliefs and conceptions of learning and approaches to study. Structural equation modeling (SEM) was applied to test the postulated relationship between epistemological beliefs and learning across the two cultural groups. The results validate the postulation that epistemological beliefs predict students’ conceptions of learning, which in turn are related to specific approaches to study. Based on multiple group analysis (SEM) both invariance and variations were detected between the Chinese and Flemish groups. The results help to develop a deeper understanding of the interplay

between epistemological beliefs and student learning from a cross-cultural perspective. Chapter 3 has been published in *Asia Pacific Journal of Education*.

Study 3, included in Chapter 4, examined Chinese student perceptions of an e-learning environment and factors affecting their performance due to an implementing an e-learning course in a Chinese setting. The specific e-learning course was a copy of the environment set-up in the Flemish setting. The study involved 90 Chinese students in Educational Sciences. During one semester of the e-learning course, the students participated in 'task-based' online group discussions, next to the face-to-face lectures. The results of this study indicate that the students adopted less positive perceptions of the e-learning environment as compared to their perceptions of their conventional environment. However, the students reported a higher preference of peer learning, critical thinking and problem-based learning after their e-learning experience. Student motivation, learning strategies and computer competence were identified as significant factors that affect the performance in online group discussion of the Chinese students. Chapter 3 is in press for publication in *Asia Pacific Education Review*.

Study 4, reported in chapter 5, compared Chinese and Flemish students' perceptions of the online collaborative learning, their motivation, and their learning strategies. A parallel e-learning environment, building on a first-year university course about "Instructional Sciences" was implemented, involving 217 Flemish students and 165 Chinese students. The findings show that the Flemish students perceive the online collaborative learning environment more positively as compared to the Chinese students. However, the motivation and learning strategies of the Chinese students clearly evolved after the online collaborative learning experience in a direction that is in line with a social-constructivist learning approach. The results also indicate that students from different cultural contexts perceive online collaborative learning environment differently. Specific cultural adaptations in e-learning design should therefore be considered when an e-learning environment is to be implemented in a cross-cultural context. Chapter 5 is based on an article published in the *British Journal of Educational Technology* and is partly based on the article accepted for publication in *Multicultural Education and Technology Journal*.

Study 5 reported in Chapter 6 focused on the examination of student satisfaction, learning performance and knowledge construction through online collaboration and the analysis of the relationship between student characteristics, knowledge construction, and academic achievement from a cross-cultural perspective. A parallel e-learning environment with online collaborative group work was implemented, involving 160 Chinese and 305

Flemish first-year university students in Educational Sciences. Differences and similarities regarding student satisfaction and dissatisfaction with online collaborative learning, and their achieved level of knowledge construction were observed. Relationships between student characteristics, online performance and academic achievement were identified and practical implications for instructional design were discussed. Chapter 6 has been submitted for publication in *Computers & Education*.

Study 6, included in Chapter 7, aimed to understand the teacher perspectives about their roles in higher education, their views about the adoption of a social constructivist approach towards teaching and learning, and their adoption of online collaborative learning. 60 Chinese and 30 Flemish university teachers were interviewed and questionnaires studying teacher roles and their perceptions about the cultural environment related to the specific educational context were studied. The results reveal different and similar perspectives between the Chinese and Flemish university staff. The results introduce a number of challenges for the implementation of instructional innovations in higher education. Chapter 7 has been accepted for publication in *European Journal of Teacher Education*.

The final chapter of this dissertation presents a summary of the research findings. Discussion of the results helps to approach the main findings from a broader perspective. Theoretical and practical implications are pointed out for research, instructional practice, and e-learning design across cultures. In addition, methodological remarks concerning cross-cultural research design and data analysis have been summarized. Lastly, directions for future research are presented.

Implications. This research has both theoretical and practical implications. At the theoretical level, the studies contribute to a better understanding of student and teacher variables that are related to teaching and learning in e-learning environment in higher education. The research provides a valid approach to consider the influence of cultural differences in students and teachers in two different cultural settings. At the practical level, the research results can inspire the future design and curriculum level implementation of e-learning.

Limitations. The studies reported in the dissertation reflect a couple of limitations. Given the cultural diffusion and dynamic development that can occur during internationalization processes, we admit that the findings of this research are applicable only for a certain period or at a certain point in time. The cultural context evolves due to continuous societal shifts, internal/external

policies, international exchange, and the changing characteristics of the population. In addition, also teachers evolve due to professional development. Directions for future research can take this into account. Additional variables affecting teaching and learning in e-learning environments can be considered in future research. A longitudinal perspective could also be useful to identify the development of generic student skills and related learning outcomes. A multilevel approach could be used in future cross-cultural research in this area to understand how differences between learners are related to differences in groups and contexts and affect the dependent variables under study.

Conclusions. In summary, both student variables and teacher variables seem to be closely related to the implementation of e-learning in higher education. Some key variables have been identified that help to unravel the differences and similarities in students and teachers in different cultural-educational contexts. Specific differences and similarities have been detected between Chinese and Flemish students regarding their learning conceptions, perceptions, satisfaction and performance in online collaborative learning. In the meantime, relationship between individual characteristics and student performance were identified. Differences between Chinese and Flemish teachers were found regarding their perspectives about teaching and learning principles, the adoption of e-learning, and online collaboration. As a result, both individual characteristics and cultural differences need to be considered when implementing e-learning courses in different cultural contexts. The current research suggests that educational policy makers and e-learning designers can build on a social constructivist framework and can rely on CSCL, but should respect the dynamic impact of particular individual student characteristics and cultural variables.

References

- Berry, J. W., Poortinga, Y. H., Segall, M. H., & Dasen, P. R. (1992). *Cross-cultural psychology: Research and applications*. Cambridge: Cambridge University Press.
- Bond, M.H. (Ed.) (1996). *The Handbook of Chinese Psychology*. Hong Kong: Oxford University Press.
- Hofstede, G. (1986). Cultural Differences in Teaching and Learning. *International Journal of Intercultural Relations*, 10, 301-320.
- Rogoff, B., & Angelillo, C. (2002). How can we study cultural aspects of human development? *Human Development*, 45, 211-226.

- Segall, M.H., Dasen, P.R., Berry, J.W. & Poortinga, Y.H. (1990). *Human behavior in global perspective*. New York: Pergamon.
- Triandis, H. C., McCusker, C. & Hui, C. H. (1990). Multimethod probes of individualism and collectivism. *Journal of Personality and Social Psychology*, 59, 1006-1020.
- Watkins, D. & Biggs, J. (2001). (Eds.). *Teaching the Chinese Learners: Psychological and Pedagogical Perspectives*. Australian Council for Educational Research / Comparative Education Research Center: Melbourne / Hong Kong.

Nederlandstalige samenvatting

E-learning in het Hoger Onderwijs: Student-en Leerkrachtvariabelen in de Chinese en Vlaamse culturele context

Inleiding. Het onderzoek, gerapporteerd in dit proefschrift focust op studentvariabelen en leerkrachtperspectieven met betrekking tot de implementatie van een online leeromgeving in het hoger onderwijs en dit in de Chinese en Vlaamse culturele context. Kernvariabelen worden bestudeerd om de percepties en het gedrag van studenten en leerkrachten in de twee culturele contexten in kaart te brengen.

Culturele context. “Cultuur” wordt in dit proefschrift benaderd als “the shared way of life of a group of people” (Berry, Poortinga, Segall & Dasen, 1992, p.1). Binnen ons onderzoek staat het begrip “culturele context” centraal (Rogoff & Angelillo, 2002). Dit verwijst naar de context zoals die is beïnvloed door culturele variabelen. Dit is verschillend in de Chinese en de Vlaamse context. In de Chinese culturele context wordt verwacht dat de context vooral beïnvloed is door de Confuciaans-Heritage Culture (CHC) (Watkins & Biggs, 2001). In de Vlaamse culturele context, wordt verwacht dat de context meer beïnvloed is door een individualistische cultuur (Hofstede, 1986).

Centrale probleemstelling en onderzoeksperspectieven. De centrale probleemstelling voor het proefschrift is: Wat is de impact van de implementatie van een online leeromgeving in twee verschillende culturele contexten, en hoe is dit gerelateerd aan studentvariabelen en leerkrachtperspectieven? De onderzoeken zijn opgezet vanuit drie onderzoeksperspectieven: het perspectief van de studenten, de online leeromgeving en het perspectief van de leerkracht. Er wordt verwacht dat de culturele context daarbij telkens een duidelijke rol speelt.

Theoretische basis. De theoretische basis bouwt verder op een sociaal constructivistisch raamwerk en concepties van Computer Supported Collaborative Learning (CSCL). Deze theoretische perspectieven benadrukken een grote sensitiviteit voor de culturele context. Dit keert ook terug in de benadering van de interculturele psychologie: “We are what we are because of our culturally based learning” (Segall, Dasen, Bes & Poortinga, 1990). De impact van de culturele context wordt daarbij bestudeerd vanuit een conceptueel raamwerk dat gebaseerd is op begrippen zoals collectivisme,

individualisme, machtafstand [power distance] en competitie (Band, 1996; Hofstede, 1986; Triandis, McCusker, & Hui, 1990). Het eerste hoofdstuk van dit proefschrift introduceert in detail de centrale probleemstelling, de theoretische basis en het onderzoeksdesign voor de verschillende studies.

De studies. De opzet en resultaten van zes empirische studies worden gerapporteerd in dit proefschrift en kunnen geordend worden volgens de hierboven vermelde drie perspectieven. Perspectief 1 wordt gevolgd in de eerste en tweede studie waarin studentvariabelen rond leren en studie centraal staan. Perspectief 2 wordt bestudeerd in de derde, vierde en vijfde studie. Daarbij staat de implementatie van de online leeromgeving in beide culturele contexten centraal. Daarbij worden de volgende studentvariabelen meegenomen: studentpercepties m.b.t. de online leeromgeving, motivatie, studenttevredenheid, hun functioneren in de online collaboratieve leeromgeving en de leerprestaties. Perspectief 3 komt aan bod in de zesde studie die zich richt op de opvattingen van lesgevers over hun rollen, hun visie en opvattingen over leren en instructie en de mate van adoptie van een online leeromgeving. In de verschillende onderzoeken worden kwantitatieve en kwalitatieve onderzoeksmethodes gehanteerd.

Studie 1 wordt gerapporteerd in Hoofdstuk 2 en onderzoekt de relatie tussen de culturele context, het kennisdomein, studentopvattingen over leren [conceptions of learning] en studiebenaderingen [approaches to study]. De Conceptions of Learning Inventory (COLI) en de Approaches and Study Skills Inventory for Students (ASSIST) werden afgenomen bij 362 Chinese en 360 Vlaamse eerstejaars universiteitsstudenten in communicatiewetenschappen en pedagogische wetenschappen. Een confirmatorische factoranalyse werd toegepast om de structuurvaliditeit van de gebruikte instrumenten in de Chinese en Vlaamse context te bevestigen. De resultaten tonen aan dat Chinese studenten sterker dan Vlaamse studenten de volgende leeropvattingen reflecteren: leren als “begrijpen”, leren als “persoonlijke verandering” en leren als het “ontwikkelen van een sociale competentie”. Er werden geen verschillen vastgesteld in de mate waarin Vlaamse of Chinese studenten leren zien als memoriseren. Studiebenaderingen [approaches to study] blijken ook te variëren volgens het kennisdomein. Ook werden verbanden vastgesteld tussen leeropvattingen en studiebenaderingen, maar die varieerden tussen de Chinese en de Vlaamse studenten. Een en ander betekent dat zowel verschillen in cultuur als verschillen in de leercontext in overweging moeten worden genomen. Hoofdstuk 2 is gepubliceerd in *Learning and Individual Differences*.

Studie 2 wordt gerapporteerd in Hoofdstuk 3 en gaat dieper in op de verbanden tussen epistemologische opvattingen, leeropvattingen en studiebenaderingen. Op basis van structural equation modeling (SEM) werd het verband getest tussen deze variabelen en daarbij werden mogelijke verschillen tussen de twee culturele contexten geanalyseerd. De resultaten bevestigen de hypothese dat epistemologische opvattingen de leerconcepties helpen voorspellen, die op zich duidelijk gerelateerd zijn aan studiebenaderingen. Op basis van een multiple group analysis (SEM) zijn daarbij gelijkenissen en verschillen tussen Chinese en Vlaamse studenten vastgesteld. De resultaten helpen een beter inzicht te verwerven in de samenhang tussen epistemologische opvattingen en het leren van studenten vanuit een crosscultureel perspectief. Hoofdstuk 3 werd gepubliceerd in de *Asia Pacific Journal of Education*.

De opzet en de resultaten van studie 3 worden behandeld in Hoofdstuk 4. Daarin worden de percepties van Chinese studenten omtrent de leeromgeving besproken en factoren die hun leerprestaties beïnvloeden. De Chinese studenten studeerden daarbij in een leeromgeving die opgezet werd als een exacte kopie van de aanpak in de Vlaamse culturele context. 90 Chinese studenten volgden gedurende één semester een cursus onderwijskunde waarbij ze naast het wekelijks contactonderwijs ook verplicht waren om in kleine groepen deel te nemen aan de taakgebaseerde online discussiegroepen (CSCL). De onderzoeksresultaten wijzen uit dat de Chinese studenten aanvankelijk minder positief staan tegenover de online leeromgeving, vergeleken met hun conventionele leeromgeving. Na het feitelijk studeren in de online leeromgeving blijken hun opvattingen echter te evolueren en appreciëren ze sterker samenwerkend leren, kritisch denken en een probleemgestuurde aanpak. De volgende factoren worden verder geïdentificeerd als variabelen die de leerprestaties in de CSCL omgeving beïnvloeden: motivatie, specifieke leerstrategieën en het niveau van computerbekwaamheid. Hoofdstuk 3 is momenteel in druk in het tijdschrift *Asia Pacific Education Review*.

Studie 4 in hoofdstuk 5 vergelijkt de percepties van Chinese en Vlaamse studenten over de online collaboratieve leeromgeving (CSCL), hun motivatie en hun leerstrategieën. Voor deze studie werd opnieuw een online leeromgeving parallel geïmplementeerd bij 217 Vlaamse en 165 Chinese eerste jaarsstudenten. De onderzoeksresultaten tonen aan dat de Vlaamse studenten positiever staan tegenover online samenwerkend leren. Maar de resultaten bevestigen eveneens dat de percepties van de Chinese studenten – door de concrete leerervaring – geleidelijk evolueren in de richting van een sociaal-constructivistische visie op leren. Studenten van verschillende culturele contexten blijken online samenwerkend leren verschillend waar te nemen. Dit

duidt het belang aan van een concrete aanpassing aan de culturele context bij het onderwijskundig ontwerpen van een online leeromgeving. Hoofdstuk 5 is deels gebaseerd op het artikel gepubliceerd in de *British Journal of Educational Technology* en deels op het artikel dat aanvaard is voor publicatie in het *Multicultural Education and Technology Journal*.

Studie 5 in Hoofdstuk 6 focust op een analyse van de studenttevredenheid, de kennisconstructie en de leerprestaties van Chinese en Vlaamse studenten in een online samenwerkingsomgeving (CSCL). Opnieuw wordt daarbij gewerkt in een gelijke leeromgeving die parallel is geïmplementeerd in de Chinese en Vlaamse culturele context. Uit het onderzoek bij de 160 Chinese en de 305 Vlaamse studenten blijkt dat er significante verschillen, maar ook gelijkenissen bestaan in de studenttevredenheid rond online samenwerkend leren. Er worden ook duidelijke verschillen in kennisconstructie vastgesteld. Verder wordt een relatie geobserveerd tussen studentkenmerken, online kennisconstructie en de leerprestaties. Op basis van de bevindingen worden praktische implicaties voor het ontwerpen van leeromgevingen besproken. Hoofdstuk 6 is ingediend voor publicatie in het tijdschrift *Computers & Education*.

Studie 6, gerapporteerd in Hoofdstuk 7, gaat dieper in op de opvattingen van lesgevers over hun rol in het hoger onderwijs, hun opvattingen en meningen over een sociaal constructivistische benadering van leren en instructie en de mate waarin ze zelf een aanpak via online leren en CSCL implementeren. Het onderzoeksdesign is gebaseerd op gestructureerde interviews met 60 Chinese en 30 Vlaamse professoren, verrijkt met informatie verzameld via vragenlijsten over hun rol opvattingen en hun eigen culturele instructiecontext. De resultaten leveren duidelijke gelijkenissen en verschillen op in de opvattingen van de Chinese en Vlaamse professoren. De resultaten zijn nuttig voor het onderwijskundig ontwerpen van cultureel aangepaste leeromgevingen. Hoofdstuk 7 is aanvaard voor publicatie in het tijdschrift *European Journal of Teacher Education*.

In Hoofdstuk 8 worden de onderzoekbevindingen van de zes studies samengevat en aangevuld met een algemene discussie en conclusie. De theoretische en praktische implicaties worden besproken voor vervolgonderzoek, voor de instructiepraktijk en voor het ontwerpen van cultureel sensitieve online leeromgevingen. Er worden een reeks methodologische beperkingen samengevat die ingaan op crosscultureel onderzoek en het onderzoeksdesign. Een reeks voorzetten worden beschreven voor vervolgonderzoek.

Implicaties. Dit onderzoek heeft zowel theoretische als praktische implicaties. Op het theoretische vlak, dragen de studies bij tot een beter inzicht in de rol van student- en leerkrachtvariabelen bij leren en instructie in online leeromgevingen in het hoger onderwijs. De onderzoeksresultaten ondersteunen het belang van het erkennen van cultuurverschillen tussen studenten en lesgevers in verschillende culturele contexten. Op het praktische vlak kunnen praktische tips voor het ontwerpen van een succesvolle e-learning omgeving worden afgeleid die rekening houden met specifieke kenmerken van Chinese of Vlaamse studenten en hun respectievelijke lesgevers. De praktische ervaring opgedaan met het implementeren van de online leeromgeving in de Chinese context kan zeker bijdragen tot de ruimere implementie van online leren op curriculumniveau.

Beperkingen. De voorgestelde studies hebben een paar beperkingen. Cultuur is namelijk geen statisch gegeven en lerenden kunnen gedurende het onderzoek dan ook op een niet gecontroleerde manier beïnvloed zijn door internationaliseringprocessen. De culturele context “verandert” door de ruimere evoluerende sociale context, interne/externe beleidsmaatregelen, internationale contacten, veranderingen in de algemene populatie. Daarnaast veranderen ook lesgevers die bijv. een verdere professionele ontwikkeling krijgen.

De vastgestelde beperkingen helpen vulling te geven aan ideeën voor vervolgonderzoek. Zo kan er meer aandacht besteed worden aan extra variabelen die instructieprocessen beïnvloeden in een online leeromgeving. Er kan ook een meer longitudinaal perspectief gevolgd worden om de ontwikkeling van generieke vaardigheden en de invloed op leerresultaten in kaart te brengen. Een multi-level analyse perspectief kan aanvullend helpen om de invloed op afhankelijke variabelen concreter te kunnen toewijzen aan studentverschillen, groepsverschillen en verschillen gerelateerd met de culturele context.

Conclusies. Samenvattend kan gesteld worden dat zowel student- als leerkrachtvariabelen gerelateerd kunnen worden aan de implementatie van een online leer omgeving in het hoger onderwijs. Kernvariabelen konden geïdentificeerd worden die helpen gelijkenissen en verschillen te beschrijven tussen studenten en lesgevers in de Chinese en Vlaamse culturele context. Specifieke verschillen en gelijkenissen werden ontdekt tussen Chinese en Vlaamse studenten wat betreft hun leerconcepties, percepties van de leeromgeving, tevredenheid, niveau van kennisconstructie en de leerresultaten via het samenwerkend leren. Daarnaast werd ook een duidelijke samenhang

vastgesteld tussen individuele studentkenmerken en leerprestaties. Er bestaan verder duidelijke verschillen tussen Chinese en Vlaamse lesgevers in hun percepties over leer- en instructieopvattingen, hun visie over online samenwerkend leren en de mate van adoptie van een online leeromgeving.. De resultaten suggereren dat er rekening dient gehouden te worden met culturele verschillen bij het ontwerpen van adequate leeromgevingen voor verschillende culturele contexten. De onderzoeksresultaten wijzen verder uit dat beleidsmakers en ontwerpers van online leeromgevingen kunnen voortbouwen op een sociaal constructivistisch raamwerk en op een CSCL aanpak, maar dat ze daarbij duidelijk de dynamische impact van cultuurvariabelen en individuele student- en leerkrachtvariabelen niet mogen negeren.

Referenties

- Berry, J. W., Poortinga, Y. H., Segall, M. H., & Dasen, P. R. (1992). *Cross-cultural psychology: Research and applications*. Cambridge: Cambridge University Press.
- Bond, M.H. (Ed.) (1996). *The Handbook of Chinese Psychology*. Hong Kong: Oxford University Press.
- Hofstede, G. (1986). Cultural Differences in Teaching and Learning. *International Journal of Intercultural Relations*, 10, 301-320.
- Rogoff, B., & Angelillo, C. (2002). How can we study cultural aspects of human development? *Human Development*, 45, 211-226.
- Segall, M.H., Dasen, P.R., Berry, J.W. & Poortinga, Y.H. (1990). *Human behavior in global perspective*. New York: Pergamon.
- Triandis, H. C., McCusker, C. & Hui, C. H. (1990). Multimethod probes of individualism and collectivism. *Journal of Personality and Social Psychology*, 59, 1006-1020.
- Watkins, D. & Biggs, J. (2001). (Eds.). *Teaching the Chinese Learners: Psychological and Pedagogical Perspectives*. Australian Council for Educational Research / Comparative Education Research Center: Melbourne / Hong Kong.

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SSCI indexed journals

- Zhu, C., Valcke, M. & Schellens, T. (2009). Cultural differences in the perception of a social constructivist e-learning environment. *British Journal of Educational Technology*. 40 (1), 164-168.
- Zhu, C., Valcke, M., Schellens, T. & Li, Y. (in press). Chinese Students' perceptions of an e-learning environment and factors affecting their performance: implementing a Flemish e-learning course in a Chinese educational context. *Asia Pacific Education Review*. 10 (2), June 30, 2009.
- Zhu, C., Valcke, M. & Schellens, T. (2009). A cross-cultural study of teacher perspectives on teacher roles and adoption of online collaborative learning in higher education. Manuscript accepted for publication in *European Journal of Teacher Education*.
- Zhu, C., Valcke, M. & Schellens, T. (2008). A cross-cultural study of Chinese and Flemish university students: Do they differ in learning conceptions and approaches to learning? *Learning and Individual Differences* 18, 120-127.
- Zhu, C., Valcke, M. & Schellens, T. (2008). The Relationship between epistemological beliefs, learning conceptions, and approaches to study: a cross-cultural structural model? *Asia Pacific Journal of Education*, 28 (4), 411-423.

Non-SSCI indexed journals

- Zhu, C., Valcke, M. & Schellens, T. (in press). A cross-cultural study of online collaborative learning. *Multicultural Education and Technology Journal*. 2009.
- Zhu, C. (2008). E-learning, constructivism and knowledge building. *Educational Technology*, 48 (6), 29-31.

Submitted, under review

- Zhu, C., Valcke, M., Schellens, T. & Zhang, C. (2008). Online collaborative learning: are there cultural differences in student satisfaction, knowledge construction and academic performance? Manuscript submitted for publication in *Computers & Education*.

Conference proceedings

- Zhu, C., Valcke, M., & Schellens, T. (2008). Students' perceptions of, motivation and learning strategies in a constructivist e-learning environment: comparing Chinese and Flemish university students. In Y. Waghid, F. Dochy & C. Carl (Eds.), *Conference Book of the EARLI*

2008 Advanced Study Colloquium Research on Cultural Differences and the Influence on Education in Teaching and Teacher Education (pp.186-207). Stellenbosch: University of Stellenbosch.

- Valcke, M., Zhu, C., & Schellens, T. (2008). A cross-cultural study of student learning in e-learning environments. In Y. Waghid, F. Dochy & C. Carl (Eds.), *Conference Book of the EARLI 2008 Advanced Study Colloquium Research on Cultural Differences and the Influence on Education in Teaching and Teacher Education* (pp.208-222). Stellenbosch: University of Stellenbosch.
- Zhu, C., Valcke, M., & Schellens T. (2008). Collaborative learning in a social constructivist e-learning environment: a cross-cultural study. In Cool, E. Van den Broeck, H. Evans, C. & Redmond, T. (Eds) *Style and cultural differences: how can organizations, regions and countries take advantage of style differences?* Proceedings of the 13th Annual Conference of the European Learning Styles Information Network. (pp.617-630). Vlerick Leuven Gent Management School, Gent, Belgium.
- Zhu, C., Valcke, M., & Schellens T. (2008). Student learning: beliefs, conceptions, and approaches: is there a cross-cultural pattern? In Cool, E. Van den Broeck, H. Evans, C. & Redmond, T. (Eds) *Style and cultural differences: how can organizations, regions and countries take advantage of style differences?* Proceedings of the 13th Annual Conference of the European Learning Styles Information Network. (pp.631-645). Vlerick Leuven Gent Management School, Gent, Belgium.

Conference contributions

- Zhu, C., Valcke, M., Schellens T., & Zhang, C. (2008). Online collaborative learning: a cross-cultural study. ECER 2008 Annual Conference: From Teaching to Learning. 10 - 12 September, 2008, Gothenburg, Sweden.
- Zhu, C., Valcke, M. & Schellens, T. (2008). A cross-cultural study of teachers' perspectives on teacher's roles and social constructivist collaborative e-learning in higher education. The 33rd Annual ATEE Conference, 23-27 August, 2008, Brussels, Belgium
- Zhu, C., Valcke, M., Schellens T., & Li, Y., (2008). Chinese students' perceptions of an e-learning environment and factors affecting their performance. EARLI JURE: Innovative and Creative Perspectives New Directions in Educational Research. July 8-11, 2008, Leuven, Belgium.
- Zhu, C., Valcke, M., & Schellens T. (2008). Student learning: beliefs, conceptions, and approaches: Is there a cross-cultural pattern? ELSIN 13th Annual Conference, 23-25 June 2008, Ghent, Belgium.

- Zhu, C., Valcke, M. & Schellens T. (2008). Collaborative learning in a social constructivist e-learning environment. ELSIN 13th Annual Conference, 23-25 June 2008, Ghent, Belgium.
- Zhu, C., Valcke, M., & Schellens T. (2008). A structural model of epistemological beliefs, conceptions of learning, and approaches to study of Chinese and Flemish university students. The annual meeting of American Educational Research Association (AERA), New York, USA, 24-28 March 2008.
- Zhu, C., Valcke, M., & Schellens T. (2008). Student perceptions of, motivation and learning strategies in a constructivist e-learning environment: comparing Chinese and Flemish university students. The EARLI Advanced Study Colloquium (ASC), Stellenbosch, South Africa, 14-18 January 2008.
- Zhu, C., Valcke, M., & Schellens T. (2007). Perceptions of a constructivist e-learning environment and involvement of student motivation and learning strategies: comparing Chinese and Flemish university students. The annual European Conference on Educational Research (ECER), Ghent, Belgium, 19-22 September 2007.
- Zhu, C., Valcke, M., & Schellens T. (2006). Investigation of learning conceptions and study approaches of Chinese and Flemish university students. The Asia-Pacific Educational Research Association (APERA) International Conference, Hong Kong, 28-30 November 2006.
- Zhu, C., Valcke, M., & Schellens T. (2006). Implementing a Flemish e-learning course in the Chinese educational context: student computer literacy, learning motivation, strategies, appreciation and performance. The Asia-Pacific Educational Research Association (APERA) International Conference, Hong Kong, 28-30 November 2006.